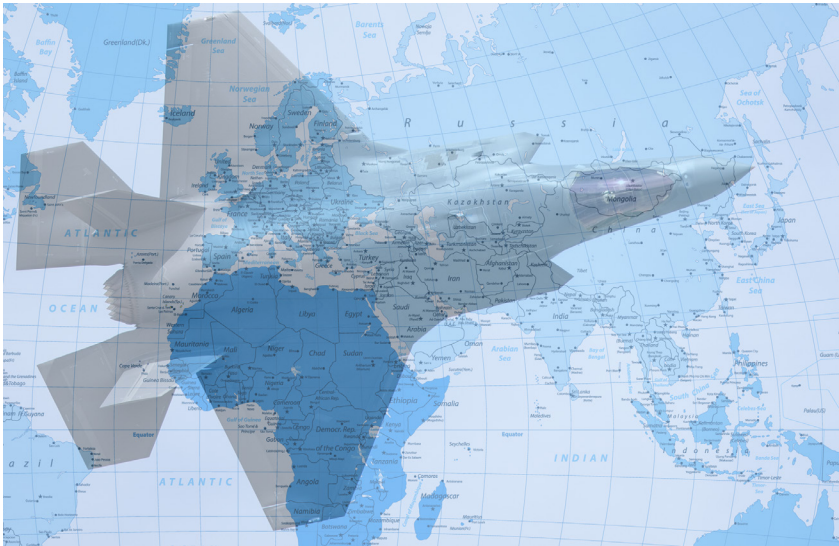




CLINT REACH, ALYSSA DEMUS, EUGENIU HAN, BILYANA LILLY,
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Russian Military Forecasting and Analysis

The Military-Political Situation and Military
Potential in Strategic Planning



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Preface

In previous research, we found that modern Russian assessments of the correlation of forces and means (COFM) were confined to the military sphere and primarily used for operational planning.¹ Political, economic, technological, and cultural considerations in comparisons of a country's ability to wage war were absent in Russian military and political references to COFM, which was a departure from Soviet practice during the Cold War. Drawing on a framework from the Russian military science community, this report shows that nonmilitary factors are still a part of Russian strategic military planning. These factors are evaluated through such indicators as the military-political situation, military potential (state power), and the level of military security after taking into account strategic deterrence potential. Forecasts of these indicators aid decisions on the future force structure and training of the Russian armed forces. The purpose of this report is to explain how these concepts are defined and applied by Russian military scientists and officers today.

The research reported here was completed in September 2020 and underwent security review with the sponsor and the Defense Office of Prepublication and Security Review before public release.

This publication was sponsored by the Russia Strategic Initiative, United States European Command, and conducted within the International Security and Defense Policy Center of the RAND National Security Research Division (NSRD), which operates the National Defense

¹ Clint Reach, Vikram Kilambi, and Mark Cozad, *Russian Assessments and Applications of the Correlation of Forces and Means*, Santa Monica, Calif.: RAND Corporation, RR-4235-OSD, 2020.

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Summary

Military forecasting informs long-term military planning of the Russian Ministry of Defense. In general, it assists in answering two questions: (1) what is the likelihood and character of future war and (2) what is the correlation of military potential between Russia and possible adversaries? In this report, we draw on a framework developed within the Russian military science community to examine several key indicators related to military forecasting to gain insight into Russian military planning. These indicators include the military-political situation, the correlation of military potential, and Russia's overall level of military security after taking into account strategic deterrence potential (see Figure S.1).

The Russian military science and academic research we reviewed found that the correlation of *military potential*—a derivative of state power that includes political, economic, scientific-technical, and conventional armed forces indicators—will be weighted in favor of the United States and the North Atlantic Treaty Organization (NATO) in the West and the United States and Japan in the Asia-Pacific region through 2040. The factors that improve Russia's competitive position are the inclusion of China in the correlation of military potential and the possible reduced ability of the United States to manage the international system in a way that favors its interests.

Russia believes that despite overall weakness, its strategic deterrence potential is sufficient to deter conflict with the West and China. However, Russia's strategic nonnuclear deterrence potential (conventional long-range strike) is still in a nascent phase of development, which could prove problematic if Russian general-purpose forces were

not able to localize a conflict and prevent expansion to a regional war encompassing thousands of kilometers of terrain.

Russia's current military assessments and forecasts have not found indications of intentions of the United States or China to launch a large-scale war against Russia. In general, Russian military leaders since the early 2000s to at least 2016 have consistently argued that local conflicts with Russia's neighbors and internal conflicts fomented from abroad are most probable, while the likelihood of large-scale war remains low. Senior Russian commanders nevertheless allow for the possibility that a local armed conflict could expand to include a larger region, which would, if NATO were to become involved, shift the primary emphasis of such a war to the aerospace attack and the infrastructure that enables it. This regional war scenario could be driving increased Russian attention to the state of the country's mobilization system.

The present and forecasted military potential correlation favors the United States and its allies for the next two decades, using the current alliance structure. The conditions under which Russia might take preemptive military action that risks war with an opponent with superior military potential remain an open question. Based on Figure S.1, one scenario could involve Russian perceptions of an imminent loss of credibility of its nuclear and strategic nonnuclear deterrence potential.

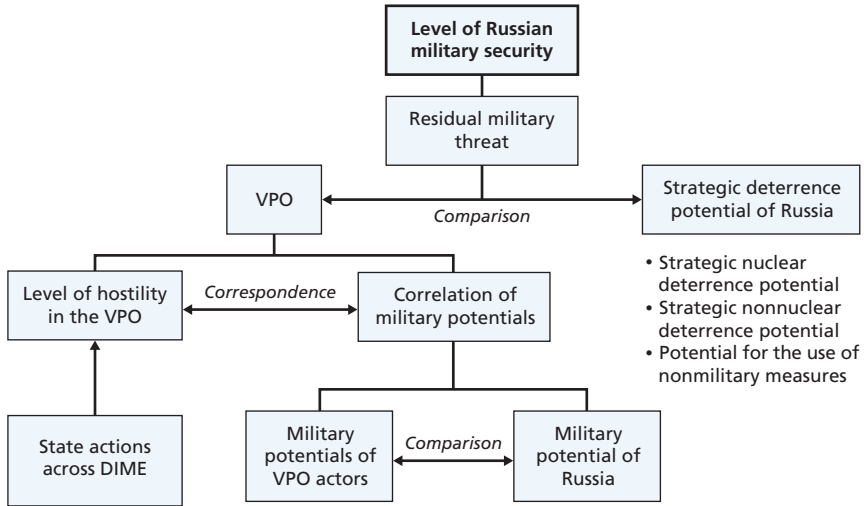
Implications

The aforementioned findings have the following implications for great power competition between the West and Russia:

- Given the large military potential imbalance between the two sides, the continued cohesion of the NATO alliance will likely force Russia to resolve political grievances without resorting to the use of force against NATO.
- NATO cohesion also creates at least three operational problems for Russia. First, Russia would have to fight a collection of countries that together possess a preponderance of military potential that could prove decisive in the event of a protracted conflict.

Figure S.1

Russian Military Science Framework for Assessment and Forecast of Military Security



SOURCES: Slightly adapted from S. P. Belokon', "Otsenivanie sostoiianiia natsional'noi i voennoi bezopasnosti Rossii: ustanovlennyi poriadok i vozmozhnye puti sovershenstvovaniia," *Vestnik Moskovskogo gosudarstvennogo universiteta, Seriya 25, Mezhdunarodnye otnosheniia i mirovaia politika*, Vol. 1, 2018, p. 36. See also V. M. Burenok, ed., *Kontseptiia obosnovaniia perspektivnogo oblika silovykh komponentov voennoi organizatsii Rossiiskoi Federatsii*, Moscow: Granitsa Publishing House, 2018b, pp. 78–79; and S. R. Tsyrendorzhiev, "O kolichestvennoi otsenke stepeni voennoi bezopasnosti," *Voennaia mysl'*, No. 10, 2014.

NOTES: DIME = diplomatic, information, military, and economic domains; VPO = military-political situation. VPO actors are the leading countries of the world that have or could build large militaries. They include the United States, Brazil, Great Britain, France, Germany, South Africa, Egypt, Israel, Saudi Arabia, Turkey, Iran, Russia, Pakistan, India, China, North Korea, South Korea, and Japan.

Second, NATO cohesion could force Russia to launch attacks throughout Europe, making a split in the alliance more unlikely. Third, NATO cohesion could expose Russia's relatively limited inventory of long-range conventional munitions (strategic non-nuclear deterrence potential). Long-range conventional capability would be essential in the initial period of war to preclude the use of a large swath of European territory to flow in additional forces and launch attacks against Russian forces.

- Russia likely will seek to avoid simultaneous confrontational relations with China and the West over the following two decades, which could inhibit its flexibility in foreign policy decisions.
- Current and future development of Russian military strategy will be from a position of overall weakness relative to the United States and its allies.
- Finally, the framework used in this report offers a useful approach to evaluate deterrence vis-à-vis Russia. For example, because the framework emphasizes the deterrence value of strategic non-nuclear capabilities, the degree of U.S. and allied superiority in long-range precision munitions offers one key input to gauge the level of deterrence against Russian military aggression.

Note on Military Conflict Terminology

There are numerous references throughout this report to levels of military conflict. The Russian military has a specific typology of military conflicts, each of which has certain implications. The primary mission of the Russian Armed Forces is to prevent all types of military conflict, but if one is to occur, it should be contained at the lowest level possible and not escalate to a point that could threaten the existence of the Russian state. According to the 2014 Russian Military Doctrine, the following are the types of military conflict, with the definitions taken from the English translation of the doctrine posted on the website of the Russian Embassy to the United Kingdom.¹

Military conflict is a form of resolving interstate or intrastate contradictions with the use of military force (the term encompasses all types of armed confrontation, including large-scale, regional, and local wars and armed conflicts).

Armed conflict is an armed clash of a limited scale between states (international armed conflict) or between opposing sides in the territory of one state (internal armed conflict).

Local war is a war pursuing limited military-political objectives when military actions take place within the borders of the warring states and affecting mainly the interests (e.g., territorial, economic, political) of these states.

¹ Embassy of the Russian Federation to the United Kingdom of Great Britain and Northern Ireland, “Military Doctrine of the Russian Federation,” webpage, June 29, 2015.

Regional war is a war involving several states of the same region waged by national or coalition armed forces in the course of which the sides are pursuing important military-political objectives.

Large-scale war is a war between coalitions of states or major states of the world community in which the sides are pursuing radical military-political objectives. A large-scale war may result from an escalation of an armed conflict or a local or regional war and involve a significant number of states from different regions of the world. It would require mobilization of all physical resources available and spiritual strength of the participating states.

Abbreviations

AI	artificial intelligence
AHP	analytic hierarchy process
ALCM	air-launched cruise missile
APEC	Asia-Pacific Economic Cooperation
BRICS	Brazil, Russia, India, China, South Africa
C2	command and control
CIS	Commonwealth of Independent States
COFM	correlation of forces and means
CT	critical technology
ESID	integrated input data system
EU	European Union
FOI	Swedish Defence Research Agency
FPI	Prospective Research Foundation
FSB	Federal Security Service
GDE	gross domestic expenditure
GDP	gross domestic product
GNP	gross national product

GRU	Main Intelligence Directorate
ICBM	intercontinental ballistic missile
IMEMO	Institute of World Economy and International Relations
INES	Institute for Economic Strategies
INF	Intermediate-Range Nuclear Forces
KGB	Committee for State Security
MChS	Ministry of Emergency Situations
MGIMO	Moscow State Institute of International Relations
MGU	Moscow State University
MO	international situation (<i>mezhdunarodnaia obstanovka</i>)
MOD	Ministry of Defense
MT	military technologies
NATO	North Atlantic Treaty Organization
NIE	National Intelligence Estimate
NII	scientific research institute
NTsUO	National Defense Management Center
OTEI	Department of Technical-Economic Research
R&D	research and development
RARAN	Russian Academy of Missile and Artillery Sciences
RSTF	Russia 2030: Science and Technology Forecast
S&T	science and technology
SAP	State Armaments Program

SDO	State Defense Order
SLBM	submarine-launched ballistic missile
SOP VEP	Compendium of Statistical and Estimated Indicators of the Military-Economic Potential
STB	scientific and technical base
TFP	total factor productivity
TTP	Trans-Pacific Partnership
TsIVTI	Central Scientific Research Institute of Military- Technical Information
TsKP	Central Command Post
TsNII	Central Scientific Research Institute
TVD	theater of military operations
UAV	unmanned aerial vehicle
UPMIiSP	Directorate of Prospective Multidisciplinary Research and Special Projects
USSR	Soviet Union
VPO	military-political situation
WMSE	weapons, military, and special equipment

Introduction

The objective of forecasting in any field is to provide information to decisionmakers about what could happen in the future and under what conditions.¹ In the decades following World War II, researchers in the field of forecasting began working to formalize methodologies that would improve the quality of the input data, without which it would be impossible to produce a reliable prediction of future events.² In the late 1960s and early 1970s, several works on forecasting appeared in the West and the Soviet Union that had an influence on Soviet and then Russian military forecasting. In 1975, for example, the Soviet researchers Yu. V. Chuev and Yu. B. Mikhailov published a book, *Prognozirovanie v voennom dele* (*Forecasting in Military Affairs*) that adapted the aforementioned work in the field of forecasting to a military context. Chuev and Mikhailov's work has influenced the Russian approach to military forecasting that is in use today.

Chuev and Mikhailov argued that a broad framework that took into account present and future indicators across a variety of elements of state power was most appropriate to inform military planning in an era of large armed forces equipped with sophisticated and

¹ Yu. V. Chuev and Yu. B. Mikhailov, *Prognozirovanie v voennom dele*, Washington, D.C.: United States Air Force, February 6, 1981, p. 6.

² Chuev and Mikhailov, pp. 3–4.

diverse weapon systems.³ Their framework assumed that the so-called military-political situation (*voenno-politicheskaia obstanovka*, VPO) was inextricably linked to future developments in military, economic, and technological domains; each side of a confrontation seeks to achieve advantages in these areas to modernize their militaries. These actions in turn created military tension that could escalate given certain political conditions. Recent scholarship has described one manifestation of this dynamic as the “strategic cul-de-sac” problem. In the prenuclear era of warfare, this situation occurred when the weaker side sought the quick, decisive blow to compensate for a growing or persistent deficit in overall military potential, only to find itself in a worse position than where it started.⁴

Russian military forecasting generally follows the same approach as that of Chuev and Mikhailov, which takes a comprehensive view of military potential or *military power* (often used interchangeably in Russian writing), the latter of which is defined as “the aggregate of all the material and spiritual forces constantly activated in peacetime and wartime, and the capability of the state to mobilize all these forces for the conduct of war (or to repel aggression).”⁵ Russian military scientists and civilians still are using forecasting to identify future military threats that could occur as a result of disparities across military, economic, technological, and other indicators of military potential and Russia’s ability to mitigate those threats. What we learn from analyzing Russian military forecasts, therefore, is how Russian analysts com-

³ Chuev and Mikhailov, p. 12. To be sure, even prior to the publication of Chuev and Mikhailov’s book, in the 1960s and 1970s Russian military analysts were already taking a broad view of state/military power and the strategic context in which large militaries are developed, sustained, and employed (see Chapter Three).

⁴ Cathal J. Nolan, *The Allure of Battle*, New York: Oxford University Press, 2020, p. 10.

⁵ S. R. Tsyrendorzhiev, “O kolichestvennoi otsenke stepeni voennoi bezopasnosti,” *Voen-naia mysl’*, No. 10, 2014, p. 30. Rogozin’s military-political dictionary defines *military potential of the state* as “the total actual and potential material and spiritual capabilities of the state, which could be used for military aims. . . .” Similar to other sources we consulted for this report, the indicators of military potential are, among others, the military-scientific and military-economic capabilities of the state and the quantity and quality of arms and military equipment. See D. O. Rogozin, ed., *Voina i mir v terminakh i opredeleniakh*, Vol. 1, Moscow: Veche, 2017, p. 376.

pare themselves with their potential adversaries, such as the United States and China. We can then consider the implications of these comparisons.

Russian Military Forecasting Key Concepts

Forecasting in Russian military affairs today assumes that the armed forces are part of a larger state system that consists of interrelated political, economic, historical, cultural, technological, and military elements, and functions in certain geopolitical conditions. In Russian practice, trends in many of these broad categories within Russia and other countries with significant military potential are assessed in the present and forecast into the future to identify potential threats to Russia's military security and to conduct strategic planning.⁶ There are at least three primary military forecasts that facilitate planning requirements and decisions within the Russian Ministry of Defense (MOD)—the VPO, the comparison of military potential, and the level of military security of the country after taking into account strategic deterrence potential.⁷ This section will briefly introduce these concepts, which we will discuss in greater detail in later chapters.

The VPO is an analytical tool to inform threat assessments to the military security of Russia and to determine the probability of war. Officially, it is defined as, “[t]he condition of international life that determines and characterizes the likelihood, intensity, and scale of the use of military force and the role [of military force] in the policies of

⁶ Strategic planning, in the context of this report, falls under the purview of the Russian General Staff and includes decisions on the force structure of the armed forces and their preparation for war. See Ministry of Defense of the Russian Federation, “Strategicheskoe planirovanie,” *Voenna-entsiklopedicheskii slovar*, undated-d.

⁷ *Military security (voennaia bezopasnost’)* is defined as the “condition of the protection of the vital interests of persons, society, and the state from external and internal military threats related to the use of military force or the threat of the use of military force. . . .” See S. P. Belokon, “Otsenivanie sostoiianiia natsional’noi i voennoi bezopasnosti Rossii: ustanovlennyi poriadok i vozmozhnye puti sovershenstvovaniia,” *Vestnik Moskovskogo gosudarstvennogo universiteta, Seriya 25, Mezhdunarodnye otnosheniia i mirovaia politika*, Vol. 1, 2018, p. 27.

individual states and regions and in global politics in general.”⁸ The VPO assessment and forecast, which are conducted within the MOD, are probably classified. However, senior Russian military officers use the term to describe the overall level of tension globally or in a given region to justify the probability of military conflict. Although there is no direct U.S. equivalent, Russian descriptions of the VPO are similar to observations found in the “strategic environment” section of the 2018 National Defense Strategy.⁹ Russia formally monitors state and nonstate actions that affect the level of tension in the global and regional VPO and could lead to military conflict involving Russia on a daily basis. It also forecasts these actions to aid military planning.

There is some inconsistency within the Russian military literature on what actions or factors influence the VPO. The most-authoritative, publicly available approach to assessing the VPO includes analysis of foreign policy, military, social-political, and economic “areas of military policy,” each of which are characterized by specific “parameters.” These parameters are analyzed and assigned values using a method developed by officers from the Main Operations Directorate of the General Staff (see Figure 1.1; Appendix A depicts the “information space” parameter within the VPO framework and how Russian analysts rate information-related activities on an escalatory scale).¹⁰

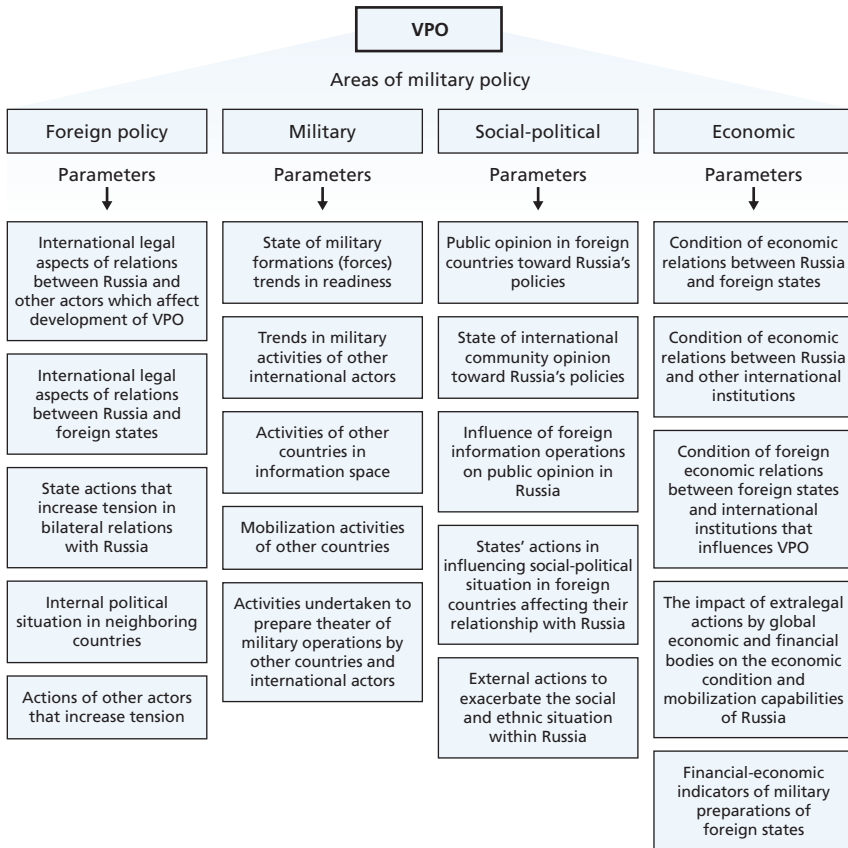
The aggregated value of the parameters of each of the four areas of military policy’s parameters provides an assessment of the tension (*naprazhennost*) in the VPO, which is characterized as calm, tense, crisis, conflict, or military clash (war). Transition along the spectrum of VPO conditions is caused by the exacerbation or improvement of the various parameters. For example, assessed intensification of information confrontation, along with a sharp change in the correlation of forces and means along a strategic direction, would increase the tension

⁸ Ministry of Defense of the Russian Federation, “Voenno-politicheskaia obstanovka,” *Voenno-entsiklopedicheskii slovar*, 2007.

⁹ Jim Mattis, *Summary of the 2018 National Defense Strategy of the United States of America: Sharpening the American Military’s Competitive Edge*, Washington, D.C.: U.S. Department of Defense, 2018, pp. 2–4.

¹⁰ Tsyrendorzhiev, 2014, pp. 30–31.

Figure 1.1
Parameters of the VPO



SOURCE: Tsyrendorzhiev, 2014, p. 31. Adapted from image courtesy of East View Information Services.

in the VPO from Russia's perspective, potentially increasing the likelihood of conflict or war. Russia would take certain preparatory or counteractions in response to the assessment (and forecast) of the VPO.

The VPO assessment is conducted within the National Defense Management Center (NTsUO) and provides a situational update to senior military and political leaders on current military threats to the

country.¹¹ VPO forecasts may also occur within the NTsUO, but as of this writing primarily were conducted through surveys of experts, at least with respect to the global VPO.¹² This approach suggests that the examination of Russian expert and military science forecasts could be helpful in understanding Russian military planning decisions.

The assessment of Russian military security (*otsenivanie voennoi bezopasnosti*) is closely related to VPO assessments and forecasts. If the VPO is intended to help identify current and future threats and determine the likelihood of war, the *level of military security* is a measure to gauge the ability of Russia's military organization to deter or to respond to the threats. The primary factors that influence military security include the strategic intentions of military powers, their *military potentials* relative to those of Russia, and the effectiveness of Russian strategic deterrence.¹³ *Military potential* is the aggregate of specified military-political, military-economic, and armed forces indicators (see Table 3.3).

The relationship between the VPO and the assessment of military security is logical enough—threat assessments and forecasts measured against current military (and nonmilitary) capabilities tend to inform day-to-day military decisionmaking and future force structure requirements.¹⁴ For example, the superiority in military potential of one state over another could be significant, while the military-political relations between the two states could be friendly or exist within an alliance, which would reduce the threat to the weaker side to practically zero. In the Russian view, the combination of the two concepts—military

¹¹ V. V. Gerasimov, "Opyt strategicheskogo rukovodstva v velikoi otechestvennoi voiny i organizatsiia edinogo upravleniia oboronoi strany v sovremennykh usloviakh," *Vestnik Akademii voennykh nauk*, Vol. 2, No. 51, 2015, p. 14.

¹² S. P. Belokon', "Tsifrovye tekhnologii kak instrumentarii otsenivaniia urovnia voennoi bezopasnosti," *Vestnik Akademii voennykh nauk*, Vol. 4, No. 69, 2019, p. 10.

¹³ V. M. Burenok, ed., *Kontseptiia obosnovaniia perspektivnogo oblika silovykh komponentov voennoi organizatsii Rossiiskoi Federatsii*, Moscow: Granitsa Publishing House, 2018b, pp. 78–79.

¹⁴ Requirements are produced by the MOD. However, they are inevitably altered because of financial constraints and vested interests of other political and military-industrial actors.

security and the VPO—centers on determining disparities in power between two sides and the hostile intentions of the stronger side.¹⁵

Figure 1.2 depicts the relationship between the VPO and the level of military security of Russia. A military threat arises as result of a negative (for Russia) comparison of military potential combined with an increased level of tension in the VPO. Despite the existence of a threat, however, Russia still possesses strategic nuclear and nonnuclear deterrence potential that could inflict unacceptable or deterrent damage on critical civilian and military infrastructure of an opponent to deter the threat of military attack or to prevent conflict escalation.¹⁶ Russia could also employ diplomatic or other nonmilitary measures to defuse a crisis situation without resorting to the threat of its military deterrence potential. The “residual threat” is what remains after considering all forms of Russian capability to mitigate a military threat.

The primary aim of this report is fill in much of the framework with assessments and forecasts of the Russian military, military science community, and civilian institutions. We are particularly interested in the comparison of military potential of Russia with other “VPO actors,” which are listed in the note that follows Figure 1.2.

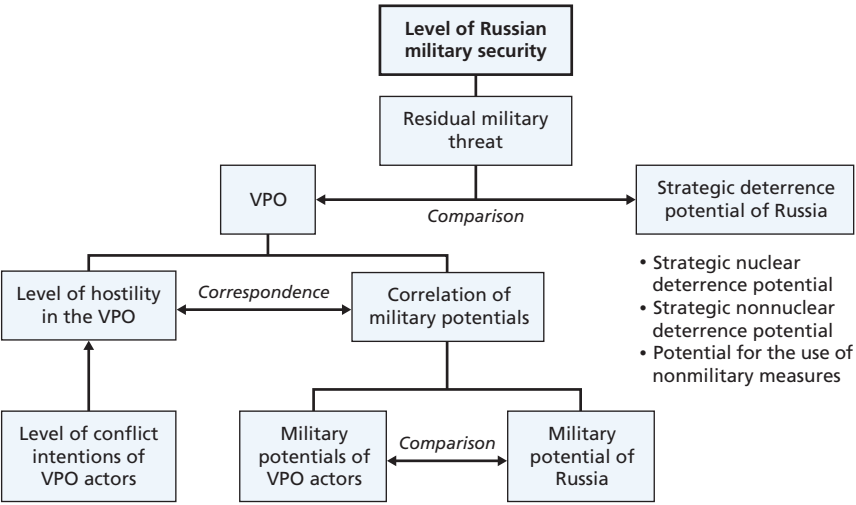
Scope and Organization of the Report

Russian military forecasting occurs within a broader strategic planning process that takes place in accordance with the Russian Federal Law No. 172, which was signed by President Vladimir Putin in late June 2014. The law stipulates that several forecasts should be conducted for specific time horizons. Those that have implications for military planning and force structure include the Long-Term Forecast of the Socio-Economic Development of the Russian Federation, the Long-Term Budget Forecast of the Russian Federation, the Strategic Forecast of the

¹⁵ Belokon', 2019, p. 7.

¹⁶ For a discussion of Russian conceptions of “damage,” see Michael Kofman, Anya Fink, and Jeffrey Edmonds, *Russian Strategy for Escalation Management: Evolution of Key Concepts*, Arlington, Va.: CNA, DRM-2019-022455-1Rev, April 2020, pp. 29–42.

Figure 1.2
Russian Military Science Framework for Assessment and Forecast of Military Security



SOURCES: Slightly adapted from Belokon', 2018, p. 36. See also Burenok, 2018b, pp. 78–79; and Tsyrendorzhiev, 2014.

NOTES: VPO = military-political situation. VPO actors are the leading countries of the world that have or could build large militaries. They include the United States, Brazil, Great Britain, France, Germany, South Africa, Egypt, Israel, Saudi Arabia, Turkey, Iran, Russia, Pakistan, India, China, North Korea, South Korea, and Japan.

Russian Federation, and the Forecast of the Scientific-Technological Development of the Russian Federation. From 2016 through 2019, each of these forecasts were completed with the results focused on the 2035–2036 timeframe.¹⁷ The Strategic Forecast, which falls under the purview of the Security Council, is not publicly available, but the findings were summarized by the Secretary of the Security Council, Nikolai Patrushev, in late 2019.¹⁸

¹⁷ Ministry of Finance of the Russian Federation, *Biudzhethnyi prognoz Rossiiskoi Federatsii na period do 2036 goda*, 2019; and Ministry of Economic Development of the Russian Federation, *Prognoz sotsial'no-ekonomicheskogo razvitiia Rossiiskoi Federatsii na period do 2036 goda*, 2018.

¹⁸ Nikolai Patrushev, "Videt' tsel'," *Rossiiskaia gazeta*, November 11, 2019.

Russian military-related forecasts are not covered in this law, but they ultimately collide with other visions of the future and strategic priorities when decisions are made on allocations for the military and other security forces. During negotiations in 2018 on the next State Armaments Program, a ten-year plan for procurement and research and development (R&D) for the armed forces as well as internal security troops, the MOD calculated a need for 55 trillion rubles, requested 36 trillion as a concession to other players, and ultimately received 16 trillion for procurement and 2 trillion for R&D. The Ministry of Finance and the military-industrial commission proposed approximately 11 trillion rubles.¹⁹ Similarly, the calculations (and preferences) of the Ministry of Finance and the Ministry of Economic Development are influential in determining the overall MOD budget.²⁰ This illustrates the limitations of Russian forecasting of military threats and force structure requirements and puts them into the larger context of Russian strategic planning at the state level.

This report is limited to investigating how the Russian military science and associated civilian expert community conducts VPO and military security assessments and forecasts, and the results of this research when the information is available. We do not cover the economic forecasts that occur in other ministries, although they are influential. The report is organized along the lines of the framework depicted in Figure 1.2. Chapter Two explores various aspects of the VPO in greater detail. Chapter Three focuses on Russian assessments and forecasts of military potential. Because technology potential is an important indicator of military potential, Chapter Four covers Russian views on the level of technological development in military affairs in the United States and Russia. In this chapter, we were interested in what Moscow believes are the critical technologies of future warfare and where it currently stands vis-à-vis the United States in the competition to develop such technologies. Chapter Five summarizes contem-

¹⁹ Konstantin Bogdanov, "Podpisalis' na 10 let: Chemu posviashchena novaia gosprogramma vooruzhenii utverzhdennaia na 2018–2027," *Izvestiya*, February 28, 2018.

²⁰ Burenok, 2018b, p. 16.

porary Russian views on the condition of the VPO and the nature of future military threats.

Research Background and Sources

In 2013, President Putin signed a decree that expanded the authorities of the General Staff. In particular, the Provision on the General Staff (*Polozhenie o general'nom shtabe*) in the “On Defense” law increased the status of the General Staff to coordinate operational and mobilization training activities, not only of the armed forces but of “other forces,” which include members of the National Guard, the Federal Security Service (FSB), the Ministry of Emergency Situations (MChS), and special formations created in wartime from the Ministries of Health, Transportation, and Economic Development, among others.²¹ According to the Chief of the General Staff, Valerii Gerasimov, the reason for the expanded authorities was the changing character of warfare that included the increased role of nonmilitary measures in the information, economic, diplomatic, and political domains to weaken an adversary prior to the employment of military force, which often was characterized by the massed employment of long-range precision munitions against critical infrastructure.²² The perceived use by the West of nonmilitary measures to foment unrest within the territory of unfriendly regimes increased the urgency of ensuring that a whole-of-government system was capable of responding to internal unrest within Russia that could be accompanied by the use of force by an external actor.²³

Because the General Staff now had greater responsibilities in the preparation of defense of the country, it required new guidance documents that considered, for example, the coordination and employment

²¹ V. V. Gerasimov, “Rol' General'nogo shtabe v organizatsii oborony strany v sootvetstvii s novym polozheniem o General'nom shtabe, utverzhdennym prezidenta Rossiiskoi Federatsii,” *Vestnik Akademii voennykh nauk*, Vol. 1, No. 46, 2014, p. 17.

²² Gerasimov, 2014, pp. 14–15.

²³ It is also possible that Russia foresaw the possibility of deploying interagency force groupings outside Russian territory, although this was not the stated reason for reform of the “On Defense” law.

of interagency force groupings that included both the regular personnel of the armed forces and security forces, such as the National Guard, from other organizations. As Gerasimov stated in 2014, “To [coordinate plans for the development of nonmilitary security forces and formations], a new guidance document is being prepared. In it there will be the primary principles of state policy in the area of military force structure and a conceptual system [*sistema vzgliadov*] detailing the objectives, tasks, directions, and activities for structuring and developing the military organization of the Russian Federation. . . .”²⁴ In Russian, the term *military organization* (*voennaia organizatsiia*) refers not only to the Ministry of Defense and the armed forces, but also includes the “other forces” listed above.²⁵

Around 2014, senior researchers from the 46th Central Scientific Research Institute (TsNII) of the MOD, the Russian Academy of Missile and Artillery Sciences (RARAN), and other organizations began work to improve the above efforts related to the development of principles for the structure of the military organization of Russia. That work culminated in the publication of a book in 2018, *Framework for the Justification of the Future Form of the Force Components of the Military Organization of the Russian Federation*. The book, and the research leading up to its publication, are important for two reasons. First, Sergei Belokon’, the head of the expert-analytic department of the Main Operations Directorate of the General Staff, explained in 2018 that the 46th TsNII had done useful research in 2014 on developing an approach to consolidate loosely integrated methods into a single assessment process to determine the level of military security of the country.²⁶ Much of the content of this work, which Russian researchers first presented in a series of articles, subsequently appeared in the book. This suggests that the methods and concepts in the book are currently in use by the General Staff or other MOD institutions. This is a critical justification for the content of this report.

²⁴ Gerasimov, 2014, p. 16.

²⁵ Gerasimov, 2014, p. 17.

²⁶ Belokon’, 2018, pp. 30–31. In particular, Belokon’ was referring to Tsyrendorzhiev, 2014.

Second, the authors of the book are some of the leading Russian experts on force development, weapons planning, and strategic deterrence. General-Major Vasilii Burenok, the editor of the book, in addition to his position as the president of the Russian Academy of Missile and Artillery Sciences, became the chairman of the Council for the Principle Designers of Weapons and Equipment for the General-Purpose Forces in 2017. Colonel Aleksandr Modin, a coauthor, was serving as a senior researcher in the 1st scientific research department of the MOD Center for the Study of Military Potential of Foreign Countries as of 2016.²⁷

The book also provides a comprehensive example of how leading Russian military science institutes conduct forecasting and analysis to inform military planning. There are extensive explanations of military security, the VPO, military potential, combat potentials and correlation of forces and means (COFM), strategic nuclear deterrence and deterrent damage (*sderzhivaiushchii ushcherb*), and the development of VPO scenarios for forecasting, nearly all of which have appeared in Russian military and military science analyses since the early 1970s.

We subsequently identified other Russian sources that have examined these subjects over the past 15 years. Our report draws on work by researchers at Moscow State University (MGU), the Institute of World Economy and International Relations (IMEMO) at the Russian Academy of Sciences, the Moscow State Institute of International Relations (MGIMO), the Institute for Economic Strategies (INES), and the independent military analysts Igor' Popov and Musa Khamzatov. Since 2000, most of these organizations or individuals have produced medium- (five to ten years) and long-term forecasts (over ten years) of defense-related topics, such as the VPO, military potential, "network power," military-economic potential, technological development, and the character of future war. Figure 1.2 itself was conceptually derived from a 2012 study on forecasting by Aleksandr Ageev and Boris Kuroedov from INES and a report on strategic planning published in 2015

²⁷ The MOD Center for the Study of Military Potential of Foreign Countries was formerly known as the 6th Scientific Research Institute (NII) and the 6th TsNII, which reportedly had some connection to the Main Intelligence Directorate (GRU). See Chapter Three for more details.

by Aleksei Podberezkin, the head of the Center for Military-Political Studies at MGIMO.²⁸ As we explain in Chapter Three, there is a history of coordination between Russian civilian institutions and the MOD in the area of military assessments and forecasting, which, again, suggests that a close study of such sources could be informative.²⁹

²⁸ Aleksandr Ageev and Boris Kuroedov, *Osobennosti primeneniia metodologii strategicheskoe matrity pri prognozirovanii razvitiia gosudarstv: na primere Rossii i Kitaia*, 2nd ed., Moscow: Institut ekonomicheskikh nauk, 2008; and A. I. Podberezkin, ed., *Strategicheskoe prognozirovanie i planirovanie vneshei i oboronnoi politiki*, Vol. 1, Moscow: MGIMO University Press, 2015, pp. 509–610.

²⁹ Director of Central Intelligence, *National Intelligence Estimate: The Soviet Assessment of the US*, NIE 11-5-75, October 9, 1975, p. 18.

The VPO in Russian Military Planning

Introduction

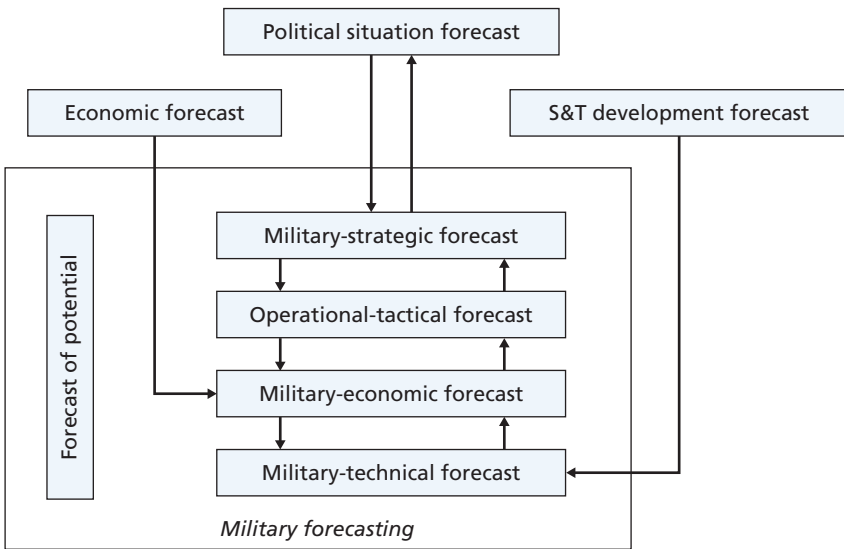
The failure by Soviet political leadership to assess the nature of the German threat and the probability of invasion in 1941 had catastrophic consequences for the Soviet Union and the Red Army. The failure was not necessarily the result of a lack of adequate intelligence, however. Soviet military and civilian agencies responsible for the collection of relevant information on German actions and intentions did deliver information to decisionmakers to warn of preparations for a large-scale war in eastern Europe.¹ Since that time, the approach to threat assessment and forecasting has been a continual point of emphasis among Soviet and Russian military science specialists. The VPO is an important tool to understand the nature of current and future threats to the Russian Federation and to plan accordingly. As mentioned previously, the VPO is most easily understood as a description of the global, regional, and local situation, which is influenced by several state actions across domains that increase or decrease the likelihood of military conflict.

Following World War II and the development of sophisticated rocket technology and other advanced air, naval, and ground weapon systems that required deep expertise, a robust scientific-technological base, and sustained economic investment, the Soviets sought to broaden their military analyses to include more-detailed examinations of military-economic and scientific-technical capabilities of both for-

¹ David E. Murphy, *What Stalin Knew: The Enigma of Barbarossa*, New Haven, Conn.: Yale University Press, 2005.

eign and Soviet actors, in addition to more-traditional assessments of weapons and the character of modern warfare.² Chuev and Mikhailov argued that military forecasting for strategic planning must go beyond COFM between opposing sides and consider economic, science and technology (S&T) development, and social trends as part of a holistic forecasting system (see Figure 2.1).³ The methods for calculating the traditional building blocks of a military forecast at the strategic level vary from expert surveys to modeling, but the framework for conducting a Russian military forecast of the VPO has not changed considerably from that presented by Chuev and Mikhailov in the 1970s.

Figure 2.1
Proposed Soviet Military Forecasting System, 1975



SOURCE: Chuev and Mikhailov, 1975. Adapted from image courtesy of East View Information Services.

² Soviet Army Studies Office, *Soviet Future War*, Ft. Leavenworth, Kan.: U.S. Army Combined Arms Center, draft study, 1987, p. 17.

³ Chuev and Mikhailov, 1981, pp. 5–18.

This chapter examines various aspects of the VPO assessment and forecast in the post-Soviet period, beginning with the geopolitical trends that most Russia observers agree will shape the military-political environment over the next two decades.

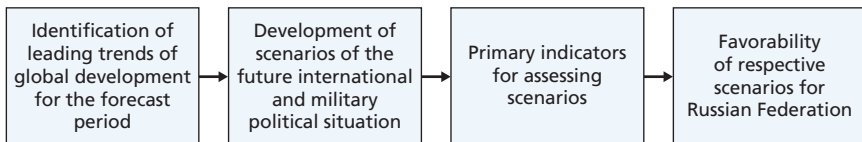
Leading Geopolitical Trends

The starting point for a military forecast is an analysis of the geopolitical trends of a given era. The purpose of understanding these trends from the perspective of those performing Russian military forecasting is twofold. First, because the future is objectively unknowable, forecasts require scenario development to allow for several different plausible eventualities in a given VPO forecast period (see Figure 2.2). Second, the study of the most important geopolitical trends helps military analysts identify countertrends (*protivorechiia*), or contradictions, that could lead to military conflict in the future. This section describes how the Russian military science and expert community understands the most influential trends that are affecting the post–Cold War international system.

Globalization and the Countertrend of “Regionalization”

In the mid-20th century, the Soviets believed that the overarching trend and countertrend were the transition from capitalism to socialism across the globe and the resistance of the West to this natural tran-

Figure 2.2
Geopolitical Trends and the VPO Forecast



SOURCE: Burenok, 2018b, pp. 286–287. Adapted from image courtesy of East View Information Services.

sition.⁴ With the United States as the primary competitor and probable enemy in a major war, there was a standing requirement to understand how the adversary functioned as a state and society, the trajectory of its foreign policy, and the makeup of its economy, including the scientific-technical base, and the disposition and structure of the armed forces; all of this could have an influence on the probability, character, and outcome of a future war. Throughout the Soviet period, the strategic planning forecasts generally found that given the military-political situation of the time, war with the West was possible and if it came it was likely to be a general war, up to and including the use of strategic nuclear weapons.⁵

According to several Russian strategic assessments and official documents, the most critical geopolitical trend affecting international relations and potentially setting the stage for the next major war in the 21st century is the intensification of globalization.⁶ In the Russian view, an increasingly globalized world is characterized by a few important features. First, power in the world is becoming more dispersed from the West toward Eurasia and East Asia. Regional power centers are attempting to consolidate their growing political, economic, and cultural influence both within their neighborhoods and in international institutions. Perhaps around 2040, China could challenge the role of the United States as the sole global superpower.⁷ The West, led by the

⁴ Iu. Ya. Kirshin, "Otsenka voenno-politicheskoi obstanovki: nekotorye voprosy metodologii i metodiki," *Voennaia mysl'*, No. 2, 1980, pp. 17–18; and D. A. Volkogonov, "XXVI s"ezd KPSS o voenno-politicheskoi obstanovke v mire," *Voennaia mysl'*, No. 7, 1981, p. 3.

⁵ V. S. Voloshko and V. I. Lutovinov, *Voennaia politika i voennaia bezopasnost' Rossiiskoi Federatsii v usloviakh globalizatsii*, Moscow: Voennoe izdatel'stvo, 2007, p. 14.

⁶ The summary that follows was drawn from Voloshko and Lutovinov, 2007, pp. 16–19. See also President of Russia, *Kontseptsia vneshnei politiki Rossiiskoi Federatsii*, Moscow, November 30, 2016; Burenok, 2018b, pp. 326–347; A. A. Dynkin, ed., *Mir 2035. Global'nyi prognoz*, Magistr, 2017, pp. 273–287; Andrew Radin and Clinton Reach, *Russian Views of the International Order*, Santa Monica, Calif.: RAND Corporation, RR-1826-OSD, 2017; Sambu Tsyrendorzhiev, "Prognoz voennykh opasnostei i ugroz Rossii," *Zashchita i bezopasnost'*, Vol. 4, 2015, pp. 10–11; and V. N. Tsygichko, "O kategorii 'sootnoshenie sil' v potentsial'nykh voennykh konfliktakh," *Voennaia mysl'*, No. 4, 2002.

⁷ Russian researchers call a future scenario—in which competition between the United States and China dominates international affairs—*Bipolarity 2.0*. See Chapter Three.

United States, is resisting this transition to the so-called polycentric world, which is creating greater tension in the international system. Also problematic from the Russian perspective is the attempt by the United States and its allies to impose their cultural and political values on other regional power centers, such as Russia and China, who reject the notion of liberal democratic development models and universal human rights.⁸

The adoption of market-based economies across the globe and their interconnectedness (e.g., international supply chains and distribution of goods), a process begun centuries ago, is another important feature of the globalized world in the Russian view. The entire world is becoming an increasingly competitive marketplace where consumption-based societies with large and growing populations and transnational corporations are seeking markets to sell goods. The quest for increased market share is driving the struggle to obtain limited natural resources, which could lead to a confrontation in the 21st century that is unresolvable by political means alone. At the same time, the level of technology-sharing between countries is on the rise, which, as a result of interdependencies from which both sides benefit, could have a tempering effect on international tensions.⁹

The advantage of the West over rising powers arriving late to the global marketplace is manifest in a variety of ways. Some examples include the West's ability to manipulate political behavior of other economic actors through economic and financial sanctions, its technological control over key infrastructure and software in the digital age, and in the development of high technology in general. As Russian Foreign Minister Sergei Lavrov stated in early 2020, "The lack of trust in global politics and the economy is being aggravated by methods of unfair competition, such as unilateral sanctions, protectionism and trade wars. The latest example of this was the U.S. attempts to hinder

⁸ Stephen Watts, Nathan Beauchamp-Mustafaga, Benjamin Harris, and Clint Reach, *Alternative Worldviews: Understanding Potential Trajectories of Great-Power Ideological Competition, Appendixes*, Santa Monica, Calif.: RAND Corporation, RR-2982-NIC, 2020, pp. 21–32.

⁹ Dynkin, 2017, p. 276.

the implementation of the Nord Stream 2. . . .”¹⁰ Alternatively, Russian analysts have argued that the increasing complexity and digitization of the industrial, financial, social, and military infrastructure of Western countries created vulnerabilities that, if exploited on a large scale, could have catastrophic consequences. According to one former Soviet officer, who is an expert on combat modeling,

The destruction that would result from military action against atomic energy stations, chemical factories, high-pressure dams, and other critical facilities could lead to regional or even global catastrophes that would carry colossal losses in terms of human life and capital that would threaten the existence of [Western] countries. The destruction of the information infrastructure alone would lead to technogenic and economic disasters due to the fact that control of all of the most important economic, social, and military infrastructure is based on the broad use of information-communication technologies. The future development and integration of the processes of globalization will make the Western world even more vulnerable. One can confidently assert that no political or economic benefit would drive the countries of the West to launch military aggression if there existed a retaliatory threat to the security of their infrastructure.¹¹

In 2019, a leading Russian analyst on strategic deterrence similarly suggested that the destruction of critical infrastructure, such as nuclear power plants, would be “inevitable” in a war between the United States and Russia or China. The threat of these actions made the outbreak of such a war highly unlikely.¹² Indeed, several Russian analysts over the course of the past two decades have concluded that a threat to Western

¹⁰ Ministry of Foreign Affairs of the Russian Federation, “Vystuplenie i otvety na voprosy SMI i.o. Ministra inostrannykh del Rossiiskoi Federatsii S.V. Lavrova v khode press-konferentsii po itogam deiatel’nosti rossiiskoi diplomatii v 2019 godu, Moskva, 17 yanvarya 2020 goda,” webpage, January 17, 2020.

¹¹ Tsygichko, 2002, p. 57.

¹² V. M. Burenok, “Kontseptual’nyi tupik,” *Vooruzhenie i ekonomika*, Vol. 3, No. 49, 2019, p. 8.

critical infrastructure has a significant deterrent effect.¹³ It is perhaps also true that a threat to Russian critical infrastructure, which supports a country that is more integrated into the global economy and reliant on high technology than its Soviet predecessor, would have a significant deterrent effect.¹⁴

A final feature of the globalized world is the development of a unified information space (the internet and, in particular, social media) that can give outsized roles to individuals or to established global media outlets in shaping not only domestic public opinion but global public opinion. The current struggle for influence in the information domain—to shape strategic narratives and influence competitor populations—has been characterized by senior Russian military officers as having the characteristics of a “war.”¹⁵ Several changes in the latest Russian Military Doctrine, released in 2014, were focused on new dangers resulting from the potential impact of foreign information streams on its population, particularly Russia’s young (see Chapter Five).¹⁶

¹³ Timothy Thomas, *Russia’s ‘New’ Military Theory: Updating Classical and Asymmetric Techniques*, McLean, Va.: MITRE Corporation, MP190451V1, April 2020, pp. 8–9. Andrei Kokoshin, the former Russian Secretary of the Security Council, in his “escalation ladder,” specifically delineated between wars that involve the destruction of critical infrastructure, such as chemical factories, and those that do not. See Andrei Kokoshin, *Voprosy prikladnoi teorii voyny*, Moscow: Vysshiaia shkola ekonomika, 2018, pp. 221–222.

¹⁴ Asya Rudkovskaya and Carlo Maria Rossotto, *Competing in the Digital Age: Policy Implications for the Russian Federation, Russia Digital Economy Report*, Washington, D.C.: World Bank, September 2018.

¹⁵ Oleg Falichev, “Pravo pervym podnyat’sya v ataku,” *Voenno-promyshlennyi kur’er*, September 11, 2018; see also M. A. Gareev, E. A. Derbin, N. I. Turko, “Metodologiya i praktika sovershenstvovaniia strategicheskogo rukovodstva oboronoi strany s uchetom kharaktera buduschikh voyn i vooruzhennykh konfliktov,” *Vestnik Akademii voennykh nauk*, Vol. 1, No. 66, 2019.

¹⁶ This uses a side-by-side analysis of the 2010 and 2014 Russian Military Doctrines. According to the 2014 doctrine, the new internal military dangers to Russia included “actions related to the informational influence on the population, first and foremost on the young citizens of the country, with the objective of undermining the historical, spiritual, and patriotic traditions in the sphere of defense of the Fatherland.” See President of Russia, *Voennaia doktrina Rossiiskoi Federatsii*, Moscow, December 25, 2014b.

Key countertrends to globalization include increasing nationalist and isolationist sentiments in various parts of the globe and a process referred to as *regionalization*. Russian analysts describe regionalization as an alternative to a globalized world whose institutions, such as the World Trade Organization, are beginning to stagnate and are not seen as delivering acceptable solutions to an increased number of vocal and empowered stakeholders. As a result, regional integration mechanisms are taking shape that are judged by Russia to be more capable of responding to the economic needs of diverse regions. Regionalization trends can either complement globalization by “lowering barriers between a growing number of regional actors” while continuing to adhere to established rules of the game, or by being a destructive force that could lead to greater economic fragmentation, with inconsistent rules and norms applied depending on the region.¹⁷ IMEMO authors cited the Asia-Pacific Economic Cooperation forum (APEC) as an example of “open regionalization” (constructive), while the U.S.’ proposed Trans-Pacific Partnership (TPP) represented “closed regionalization” (destructive).

Scenarios for Forecasting the VPO

The background on Russian assessments of key geopolitical trends has influenced current Russian military forecasting. For example, Burenok (2018b), whose analysis looked ahead to 2025 and 2040, used the six scenarios described in Table 2.1 (which are also addressed in Chapter Three) to help forecast future threats to Russia.

The Russian National Security Council, for its assessments and forecasts of *national* security, which include a greater number of indicators relative to military security assessments, used similar benchmark scenarios for its 2035 strategic forecast:¹⁸

- transition to polycentric world order

¹⁷ Dynkin, 2017, pp. 277–278.

¹⁸ Patrushev, 2019.

Table 2.1
Possible Global Scenarios to 2025 and 2040

Scenario	Description
Intense globalization	The United States manages to impose its agenda on the rest of the world, using various institutions to exert influence. Others are not capable of challenging.
Moderate globalization	The United States maintains its position in the Western world, which is increasingly in crisis. The non-Western world works to balance interests with the West.
Bipolarity 2.0	The non-Western world forms a "collective pole of force" of selected powers against the West.
The Rise of China	Crisis in the West and relative U.S. isolation. China continues economic growth and military modernization.
Regionalization	Similar to "moderate globalization," but with stronger countertrends in trade, which leads to less interregional economic activity.
Chaos	Catastrophic events (e.g., major terrorist attacks against nuclear facility) drastically reduce the economic activity of the world's largest economies.

SOURCE: Burenok, 2018b, pp. 339–358.

- continued attempts by the United States to preserve its dominance¹⁹
- formation of a bipolar global system
- intensification of regionalization processes.

Interestingly, the National Security Council scenarios were similar to those used in a 2017 forecasting study, *Mir 2035 (The World in 2035)*, led by Aleksandr Dynkin, the president of IMEMO.²⁰

¹⁹ The idea here is that there will be continued friction in international affairs as a result of the United States trying to preserve a leading role. Typical examples in relevant literature include military intervention and the use of sanctions that, in the Russian view, increase the level of regional confrontation with other states and, consequently, the probability of military conflict.

²⁰ Dynkin, 2017, pp. 236–237.

The VPO and Strategic Planning

VPO forecasts are key inputs for strategic planning.²¹ As the former Chief of the Main Operations Directorate of the General Staff General-Lieutenant Viktor Baryn'kin wrote in 1999, "Without a clear understanding of the [VPO] it is neither possible to work on military force structure matters nor wisely employ military force for the prevention or resolution of a conflict."²² Nearly 20 years later, Gerasimov similarly stated that determining the proper force structure of Russia's armed forces to ensure the military security of the country depended on "the quality of forecasting possible variants of the development of the [VPO] in the world and through analysis of [Russian] and foreign experience in employing the armed forces in recent military conflicts."²³

A forecast of the VPO will consider projected intentions and actions of military powers in conjunction with analysis of military capabilities—strategic and nonstrategic—of potential competitors in the future.²⁴ It will also predict what types of conflict involving the Russian armed forces are most likely to occur, based on prevailing trends and countertrends in international and military affairs. All of these judgments will inform military recommendations for the required force structure to carry out tasks assigned by the political leadership and will influence how the Russian military trains to fight. What form the armed forces actually take will depend not only on these recom-

²¹ For a historical connection between the VPO and strategic planning, see Kirshin, 1980, p. 15; and V. N. Danilov and B. V. Molostov, "Voenno-politicheskaia obstanovka: problemy analiza i otsenki," *Voennaia mysl'*, No. 3, 1989, p. 13. For a modern connection, see Burenok, 2018b, p. 156.

²² Viktor Baryn'kin, "Otsenka voenno-politicheskaia obstanovka: metodologicheskii aspekt," *Voennaia mysl'*, No. 5, 1999.

²³ Valerii Gerasimov, "Vliianie sovremennogo kharaktera vooruzhennoi bor'by na napravlennost' stroitel'stva i razvitiia vooruzhennykh sil Rossiiskoi Federatsii. Prioritetnye zadachi nauki v obespechenii oborony strany," *Vestnik Akademii voennykh nauk*, Vol. 2, No. 63, 2018, p. 17. See also Burenok, 2018b, p. 338; and I. M. Popov and M. M. Khamzatov, *Voina budushchego*, 3rd ed., Kuchkovo pole, 2018, p. 121.

²⁴ As we will show, at times the aggregate of military capabilities (COFM) is used as an *input* to the determination of the VPO, while in other Russian assessments, it is observed separately. In either case, the Russians ultimately are seeking conclusions about the confluence of overall power and strategic intentions.

mentations but also on nonmilitary decisionmaking factors, such as the preferences of the “financial bloc,” senior leadership of the Russian government, and the military-industrial complex, among others.²⁵ (See Appendix B for more detail on VPO methodology.)

National Defense Management Center and the VPO

For 50 years prior to 2014 the Soviet and Russian General Staff executed command and control (C2) of the Russian military from the Central Command Post (TsKP). Despite the name, during that time the collection and analysis of information required for decisionmaking and planning was not digitally unified but rather compartmentalized across headquarters at various echelons of command with lengthy lag times required to send and receive updates on troop movements and exercises, among other standard peacetime military activities.²⁶ Additionally problematic was the lack of real-time intelligence, surveillance, and reconnaissance (*razvedka*) on potential threats based on changes to the local, regional, or global VPO. According to Gerasimov,

The work at the TsKP consisted of following rapid military-political changes in the world, monitoring the condition of special types of weapons, and ensuring command and control over their sanctioned employment. To carry out these tasks there were a few secluded duty officers from the large formations of the Armed Forces[,] at the tactical level, there were non-staff duty officers within the combat units while in the regiments there were no formal structures for 24-hour duty.²⁷

At the time Barynkin was writing about VPO methodology in 1999, both assessments and forecasts required a lengthy process

²⁵ Ivan Safronov and Oleg Sapozhkov, “Bitva pri biudzhete: Minoborony i Minfin snova pokazali, kak po-raznomu smotriat na den’gi,” *Kommersant*, July 4, 2016.

²⁶ Ministry of Defense of the Russian Federation, “Nachal’nik rossiiskogo Genshtaba rasskazal zhurnalistam o zadachakh i roli National’nogo tsentra po upravleniiu oboronoi RF,” Department of Information and Mass Communication, webpage, November 1, 2014.

²⁷ Ministry of Defense of the Russian Federation, 2014.

of gathering, analyzing, and processing information from disparate, mostly nondigital sources.

In 2014, the Ministry of Defense launched the NTsUO. The purpose of the new center was to unify and modernize the collection, transfer, storage, and processing of information related to the military organization of Russia. Prior to 2014, information was passed up the chain of command in hard-copy form once a month in the case of a brigade commander to a military district commander, which, according to Gerasimov, meant that higher headquarters were often making decisions and passing guidance down the chain of command based on outdated information.²⁸

The General Staff intended the NTsUO to solve a host of issues by centralizing command and control in one location that tied together disparate parts of the military organization and that could manage routine military tasks, such as exercises, equipment transfers, and monitoring, assessing, and forecasting the VPO “in the interest of strategic and operational planning and leadership decisionmaking in peacetime and wartime,” among others.²⁹ In a 2016 interview, Defense Minister Sergei Shoigu explained that changing force dispositions in Europe and other areas were monitored by Russian intelligence means, and a NTsUO computer, presumably with a database of indicators, alerted officers to the likelihood of an imminent attack using comparisons with force movements and dispositions of previous military conflicts, such as the war in Yugoslavia in 1999.³⁰ For a list of the information that is monitored for “the analysis and forecasting of the situation” and processed by the NTsUO data center, see Table 2.2.³¹

One objective of the General Staff in the area of analysis and forecasting is to more-completely or fully automate the VPO data collection process within the NTsUO. According to researchers from

²⁸ Ministry of Defense of the Russian Federation, 2014.

²⁹ Ministry of Defense of the Russian Federation, “Natsional’nyi tsentr upravleniia oboronoï Rossiiskoi Federatsii,” webpage, undated-a; and “Natsional’nyi tsentr upravleniia oboronoï RF budet koordinirovat’ vse federal’nye ведомства,” TASS, January 20, 2014.

³⁰ Reach, Kilambi, and Cozad, 2020, p. x.

³¹ Gerasimov, 2015, p. 14.

the Mozhaiskii Military-Space Academy and the Main Space Testing Center,

At the present time there is the pressing task to assess and forecast the [VPO] at the global and regional levels . . . one of the directions for solving this task is equipping the NTsUO [Russian Federation] with hardware and software packages to analyze the [VPO] and the social-political and social-economic situation within [Russia] using artificial intelligence methods to monitor open-source information in real time.³²

Table 2.2
NTsUO Situational Assessment and Forecast Information

Category of Information	Description
Social-political	Condition during emergency situations
Social-political-military	Significant events in the world and in Russia
Social-political	Social-political situation in Russia and the Commonwealth of Independent States (CIS)
Military-security	Threat (or execution) of terrorist acts
Military-political	Military-strategic situation and the VPO in the world
Military	Condition and character of actions of troops (forces)
Military	Operational training events
Military	Manning and equipping of Russian armed forces
Military	Condition of combat readiness of Russian armed forces
Military	Condition of combat readiness of strategic offensive forces of foreign states

SOURCE: Gerasimov, 2015.

³² E. E. Filippikh, M. L. Belokopytov, A. V. Kokorev, V. V. Vladimirov, I. G. Ivanov, "Predlozheniia po avtomatizatsii deiatel'nosti organov voennogo upravleniia putem realizatsii metodov i algoritmov iskustvennogo intellekta v chasti sbora, obrabotki i analiza nestrukturnirovannykh (slabostrukturnirovannykh) dannykh," *Voprosy oboronnoi tekhniki, Seriia 16, Tekhnicheskie sredstva protivodeistviia terrorizmu*, Vol. 7–8, 2019, p. 37.

The researchers found that, as of mid-2019, the current capabilities of the automated systems used by command staffs in the NTsUO were limited to automated processing of “structured data,” such as electronic versions of formal documents, while the processing of “unstructured data,” a combination of such inputs as speeches, doctrines, news articles, and imagery, remained wholly nonautomated.³³ As a result, the personnel required to improve the likelihood of timely execution of C2 tasks has not decreased over time.

The shortcomings that the Russian researchers are observing in the processing of unstructured data is a complicated technological problem, unlikely to be resolved in the near term. What Russia appears to have at present is a semi-automated system that requires the continuous engagement of human beings to sort through collected digitized data, identify relevant pieces, and input them into a model or simply analyze the data without the help of computers. Even when computers are introduced into the process of assessing the VPO, as well as other critical planning tasks, however, there are apparently several problems. As of 2018, Burenok (2018b) found the following deficiencies in the modeling system of the armed forces:³⁴

- “There is not an agreed-upon model or method to produce an assessment of the condition and [future] development of the [VPO], the military-political and strategic nature of military threats, or the current level of military security of the Russian Federation.”
- “There are neither methods nor models that facilitate the justification of a combat composition of the Armed Forces of the Russian Federation that is necessary and sufficient to mitigate possible military threats and to ensure the military security of the Russian Federation at the required level.”
- “Operational (combat) models for strategic and operational troop (force) groupings that exist within the command staffs, the scientific-research organizations, and in the Military Academy of

³³ Filippetskikh et al., 2019, p. 36.

³⁴ Burenok, 2018b, pp. 455–456.

the General Staff are not certified and, in the vast majority of cases, are antiquated and nonautomated.”

- “Models for logistics units and subunits are antiquated, while modern methods designed on new computer technology with modern software support have not been developed.”
- “The number of scientific workers that possess the training required for developing and using models is consistently decreasing for obvious reasons. In the scientific-research organizations and in command staffs there are not organic units that are intended for the development and use of models and modeling systems, and the practice of sporadic use of modeling in the interests of conducting various types of research is widespread.”

This information suggests that while the task of assessing and forecasting the VPO has been centralized within the NTsUO and the collection of the required input data has perhaps been outsourced to some extent to machines, officers still need to comb through the data and input them into a model that has not drastically improved since 1999. Should the efforts within the military science community to consolidate disparate methods prove satisfactory, there would be the additional need of developing the software and acquiring the hardware to unify the approach to assessing and forecasting the VPO and military security within the NTsUO.³⁵

Conclusion

The official VPO assessment and forecast are classified. However, the conclusions are openly discussed within such strategic military planning documents as the Military Doctrine and by senior Russian military officers (see Chapter Five). The methodological inputs are also generally known (see Appendix B), which allows for analysis of Russian military science and civilian defense community assessments of the political, economic, military, and scientific-technical factors that

³⁵ Belokon', 2019, pp. 6–12.

influence the VPO and ultimately assist in determining the character and level of military threat to Russia. The following two chapters of the report will examine in greater detail some of the previously mentioned inputs for the VPO and military security assessment and forecast, including state power (military potential) comparisons and military and nonmilitary technological development levels.

Russian Conceptions, Assessments, and Forecasts of State Power and Military Potential

Introduction

There is a close connection between the VPO and state power of countries with advanced militaries that could pose a military threat to Russia under certain conditions. This chapter examines how Russia conceives of state power, both theoretically and in practice. To be sure, the Russian military science and civilian expert community does not appear to have coalesced around a singular term to describe the concept of state power and its integral components. For instance, the terms *state power*, *aggregate potential*, *military potential*, and *military power* are at times used interchangeably to describe a state's capability to ensure military security and wage war in the literature we examined. MOD-affiliated institutions most commonly use *military potential*. Generally speaking, military potential is a derivative of state power. In Russian military science, the military potential typically consists of military-political, military-economic, military, scientific-technical, and cultural components. *State power* is a broader concept that includes not only the above components but also elements such as territory, natural resources, and population. This chapter briefly explores the nuances between the various terms and definitions. Furthermore, it examines how the Russian military and scientific communities employ these terms in their appraisals of Russia's capabilities and the capabilities of other states in military threat assessments.

In this chapter, we first discuss sources and data that we examined. Next, we outline the history of Soviet and Russian thinking on

state power and military potential and the evolution from the Soviet era through the early post–Cold War period. We then turn to a discussion of the different contemporary concepts that Russian experts use in military assessments and forecasts, particularly state power, state status, and military power and potential, addressing the distinction between “power” and “potential.” Finally, we analyze the outcomes of Russian state power assessments and forecasts that appraise their current and future state power and that of China, the United States, and the West more broadly.¹

Sources, Data, and Methods

We reviewed both primary and secondary Russian- and English-language sources. For Soviet and Russian conceptions of state power in a historical context, we consulted sources authored by individuals with firsthand knowledge of these assessments based on their positions, historical interviews of individuals with such knowledge, and historical analyses of this period. For our analysis of recent Russian thinking on state power and military potential, we surveyed scholarly articles published in Russian military, economic, and foreign affairs journals; books; and reports authored by Russian military officers, diplomats, and scholars employed by (or affiliated with) the Russian academies of sciences system and other official institutes. We deliberately focused our review on those authors whose positions indicate their scholarship may be influential, though we cannot be certain this is the case based on title or position alone.

Our sources range from the Soviet era through present day. Our analysis on the outcomes of recent Russian state power and military potential assessments and forecasts predominantly focuses on Russia itself, China, the United States, and some European Union (EU) countries.

¹ By *assessment*, we mean an appraisal of existing conditions. By *forecast*, we mean an appraisal of future conditions.

History of Soviet and Russian Conceptions of State Power and Military Potential

Soviet-Era Terms and Concepts

Russian assessments and forecasts comparing its own might to that of its allies and adversaries can be traced back to the Soviet era. This history is complex. It appears to have involved several different Soviet institutions, numerous institutional reorganizations, and the influence of parochial and personal quarrels. These dynamics mean that the Soviet military-scientific and scholarly communities may not have always produced scholarship that employed uniform terminology or standard methodologies to measure a state's relative strength. We attempted to reconstruct this history by focusing on both Soviet assessments and forecasts of the strength of the Soviet Union and other states, as well as Soviet work in such related fields as Soviet economic assessments in an effort to capture a broad snapshot of the field. Our examination includes scholarship from three distinct but overlapping disciplines, including military theory, economics, and international relations.

We did not uncover any evidence indicating that the Soviet institutions or scholars involved in assessing and forecasting the strength of the Soviet Union—compared with that of other states—used the term *state power* (*moshch' gosudarstva*) in their work. Instead, *military-economic potential* (*voenno-ekonomicheskii potentsial*) and *military potential* (*voennyi potentsial*) appear to have been the prevailing terms used by Soviet institutions and scholars responsible for conducting such assessments and forecasts.

The relevant literature indicates that the Soviet military establishment never published a sanctioned definition of either state power or military-economic potential. Beginning in the 1970s, the Soviet Ministry of Defense published several reference texts which offered formal definitions of military terms. Although the Soviet Ministry of Defense's official 1976–1980 *Soviet Military Encyclopedia* includes references to the term military-economic potential in its treatment of

other concepts, it does not specifically define the term itself.² The same is true of another authoritative Soviet-era military reference text, the 1983 *Military Encyclopedic Dictionary*.³ That said, both of these texts include formal definitions of closely related concepts, including military potential, moral-political potential (*potentsial moral'no-politicheskii*), and economic potential (*potentsial ekonomicheskii*).⁴ This is significant in that we found that these three components—military, economic, and political (sometimes moral or spiritual is also included)—are a common thread throughout both Soviet and contemporary scholarship on this issue, despite other terminological inconsistencies.

The 1983 Soviet *Military Encyclopedic Dictionary* defines *potential* as

moral-political, spiritual capabilities of the country's population, which are determined by the level of political and moral conscience of the population turned into a factor for achieving social, economic, political, and military goals. In the military context, potential is manifested in the abilities and willingness of the population and the army to withstand all trials of war and mobilize all forces to achieve victory. As part of the military power of the state and the combat power of its armed forces, potential is inextricably linked with the combat, military, scientific, social and economic potentials and significantly determines the effectiveness of their use.⁵

This definition underscores the Soviet military science linkages between the military, economic, political, and social spheres, which we observed in the recent literature on this subject. *Military potential* was defined as the

² N. V. Ogarkov, ed., *Sovetskaia voennaia entsiklopediia*, Vol. 2: *Vavilon-grazhdanskaya voina Severnoi Amerike*, Moscow: Voenizdat, 1976; and M. P. Kolesnikov, "Rossiiskaia voennaia entsiklopediia: traditsii i sovremennost'," *Voennaia mysl'*, No. 5, 1995.

³ N. V. Ogarkov, ed., *Voennyi entsiklopedicheskii slovar'*, Moscow, 1983.

⁴ Ogarkov, 1983, pp. 581–582; N. V. Ogarkov, ed., *Sovetskaia voennaia entsiklopediia*, Vol. 6: *Ob"ekty voennye—Radiokompas*, Moscow: Voenizdat, 1978, pp. 473–477.

⁵ Ogarkov, 1983.

capabilities of the state (or coalition) to maintain and improve armed forces, increase their combat effectiveness and training, supply modern weapons and military technology, all kinds of provisions in peace and wartime, to ensure the achievement of the objectives of the war. Military potential is not a constant value. Its condition is characterized by the presence of various indicators, which most importantly include the number of personnel, their moral-political, psychological, military and military-technical readiness, and their land, sea, and air training; the quantity and quality of weapons and military equipment; the degree of logistical support for the troops; the level of development of military doctrine and theory . . . the level of combat readiness of the armed forces; the mobilization reserves and the mobilization capabilities of the state.⁶

The inclusion of nonmilitary elements, such as the moral-political and psychological preparation of the troops and the state's mobilization capabilities (beyond military mobilization), generally correspond with military-political potential and military-economic potential as understood today.⁷

Soviet and Early Post-Soviet Institutions and Scholars ***1930s Through Mid-1970s***

For much of the 1930s, 1940s, and early 1950s, the Soviet military and scientific communities were not well positioned to conduct in-depth research and analysis on economic aspects of adversaries' and allies' military-economic potentials. In 1935, the research and analytical section of the fourth directorate of the GRU was dismantled.⁸ The disbanding of the directorate meant that while the Soviets possessed the capability to determine their opponents' order of battle at the time, they did not have the requisite intelligence nor expertise to

⁶ Ogarkov, 1983, p. 582.

⁷ Ogarkov, 1983, p. 582.

⁸ The GRU, was, and is, the main intelligence directorate of the Soviet and then Russian General Staff.

accurately gauge the strength of their opponents' economies.⁹ What is more, "under Stalin, no attempt was made to compensate for this serious loss" of analytical capabilities.¹⁰

Soviet appraisals of the United States during the Stalinist period were examined and explained through the prism of Marxist-Leninist ideology.¹¹ A statement published in *Pravda* in 1950 mandating that "every Marxist work on the economics of capitalist countries must be a bill of indictment" captured this sentiment, and potentially explains why Soviet institutions of the era were not expected to produce objective assessments of the United States' or other states' economies.¹² This suggests that political and ideological content could have compensated for the absence of relevant expertise and analysis examining foreign economies in this era.

Stalin's death in 1953 ushered in a new attitude regarding Soviet efforts to understand the United States and other countries. In his study of Soviet perceptions of the United States, a former U.S. State Department analyst and scholar of Soviet affairs, Morton Schwartz, characterizes this period as one in which the Soviet leadership adopted a new approach to its appraisals of adversaries and allies. He notes, "Seeking to break with the obscurantist practices of the Stalin period, top Party leaders in the mid-1950s instructed Soviet scholars to abandon the 'dogmatic and oversimplifying' attitudes of the past. They were urged, in particular, to provide a more objective assessment of the outside world."¹³

Several important institutional changes reflected this new attitude. These included the establishment of several new bodies responsible for studying the economies, militaries, and political systems and dynamics of foreign countries. The first was the Department of

⁹ Jonathan Haslam, *Near and Distant Neighbors: A New History of Soviet Intelligence*, New York: Farrar, Strauss, and Giroux, 2015, p. 267.

¹⁰ Haslam, 2015, p. 267.

¹¹ Morton Schwartz, *Soviet Perceptions of the United States*, Berkeley, Calif.: University of California Press, 1980.

¹² *Pravda* newspaper quote referenced in Schwartz, 1980, p. 2.

¹³ Schwartz, 1980, p. 2.

Technical-Economic Research, or *otdel tekhniko-ekonomicheskikh issledovaniï* (OTEI), housed within IMEMO. Its history dates to the late 1950s, when several scholars at IMEMO began researching the status of military-technical development in key Western states and the militarization of their economies.¹⁴ Its early work piqued the interest of officials at the Soviet MOD, in the Soviet military-industrial complex, and at other state institutions.¹⁵ Soviet MOD officials supported a proposal by the IMEMO scholars to establish a separate IMEMO department devoted to the study of Western military-economic issues.¹⁶ In return, MOD officials who were involved insisted that the department employ retiring military officers.¹⁷ A new department was therefore formally established in December 1960 by special resolution of the USSR Academy of Sciences.¹⁸ The department's work focused on examining trends in Western economies which could have had positive implications for the Soviet economy.¹⁹

In 1963, OTEI was divided into four sectors, including strategic and conventional weapons, military financing and budgeting, scientific research work, and transportation.²⁰ All of its five sectors contributed to the research and drafting of a major seven-volume study on U.S. military and economic potential, which was published between 1965 and 1967.²¹ Although we do not have any insight into the findings of the study, we do know from the accounts of those familiar with OTEI's research that the department based much of its work on the

¹⁴ Petr Cherkasov, *Essay on IMEMO History*, Moscow: Izdatelstvo, 2016, p. 275.

¹⁵ Cherkasov, 2016, p. 278.

¹⁶ Robert D. English, *Russia and the Idea of the West: Gorbachev, Intellectuals, and the End of the Cold War*, New York: Columbia University Press, 2000, p. 152; and Haslam, 2015, p. 267.

¹⁷ Cherkasov, 2016, p. 278.

¹⁸ Haslam, 2015, p. 267; and Cherkasov, 2016, pp. 278–279.

¹⁹ Cherkasov, 2016, p. 281.

²⁰ Cherkasov, 2016, p. 279.

²¹ V. V. Shlykov, "Shto pogiblo Sovetskii Soyuz?" *Voennyi vestnik MFIT*, No. 8–9, 2001; and Cherkasov, 2016, p. 279.

analysis of information found in foreign sources, such as *The Economist*, publications from the Stockholm International Peace Research Initiative, *Businessweek*, *National Defense*, and others—which were only accessible in Soviet classified libraries.²²

OTEI was staffed by a combination of military personnel including retired officers and military engineers and civilian personnel (predominantly economists). As a result of these connections to the MOD, the department fostered an important relationship with the GRU, which provided OTEI with relevant information on military-economic issues.²³ These dual influences within the organization appeared to foster tensions between OTEI's military specialists—whose training meant they were better suited to conduct military-technical research—and its civilian economists whose training was more closely aligned with OTEI's mandate to produce military-economic analyses.²⁴ Over time, the two cultures and institutional influences within OTEI—that of IMEMO and that of the MOD—resulted in concerns that the department had been too far divorced from the rest of the institute, was too secretive, and was being increasingly co-opted by the military.²⁵

These tensions came to a head in 1971 when the GRU attempted to assert control over all existing Soviet bodies devoted to the study of military-economic issues of foreign states, including OTEI.²⁶ This effort proved only partially successful. In 1971, Politburo decision number 229 formalized the establishment of a new military-economic directorate (10th Directorate) within the GRU. However, this new body did not include OTEI, which after several years of resisting these efforts, was able to secure its own autonomy, though its position was diminished. Nor did the move provide the new directorate with any oversight over other ministries' work on these issues.²⁷ Likewise, the

²² Cherkasov, 2016, p. 292.

²³ Shlykov, 2001.

²⁴ Cherkasov, 2016, p. 281.

²⁵ Cherkasov, 2016, p. 293.

²⁶ Shlykov, 2001; and Cherkasov, 2016.

²⁷ Shlykov, 2001.

GRU's efforts to institutionalize the practice of receiving relevant data from other ministries and intelligence services (to incorporate into assessments and forecasts) proved fruitless.²⁸ The only data that the 10th Directorate received were figures on exports and imports from the Soviet ministry of foreign trade and information on foreign states' military industries from the Soviet military-industrial ministries.²⁹

The 10th Directorate was responsible for producing annual reports documenting the status of the military-economic potential of the United States, China, the United Kingdom, Germany, Japan, France, and Italy, and later other countries as well.³⁰ The first set of these reports, titled Compendium of Statistical and Estimated Indicators of the Military-Economic Potential, or *Sbornikov statisticheskikh i ocenочnykh pokazatelej voenno-jekonomicheskogo potenciala* (SOP VEP), was completed in 1972. According to former GRU officer and veteran of the 10th Directorate, Vitalii Shlykov, these analyses predominantly used economic statistics, such as the "population size and composition; gross national product; production of the main industrial and agricultural products; volume, composition, and geographic locations of imports and exports" as well as "the size and composition of the armed forces; the military budget; and the technical characteristics of weapons and military equipment" for the states being examined.³¹ Importantly, these indicators share similarities to those used in contemporary assessments and forecasts of state power, as we will discuss later in this chapter.

Similar to the IMEMO OTEI studies, all of the data included in the compendiums were extracted from publicly available sources. In fact, the 10th Directorate was prohibited from including any classified GRU-collected intelligence in these compendiums, despite the compendiums themselves being classified as top secret. Shlykov suspects that this restriction was motivated by internal parochial interests.

²⁸ Shlykov, 2001.

²⁹ Shlykov, 2001; and Anatolii Tereschenko and Aleksandr Vdovin, *Iz SMERSHa v GRU: Imperator spetssluzhb*, 2013.

³⁰ Shlykov, 2001.

³¹ Shlykov, 2001.

The classified intelligence, according to Shlykov, might have revealed that the GRU's appraisals of Western states' mobilization efforts and capacities were overblown, which could have jeopardized MOD justifications for its own mobilization requirements.³²

Furthermore, according to Shlykov, the Soviet military leadership felt that IMEMO's appraisals underestimated China and the West's mobilization capability.³³ An account by Shlykov's contemporary, Vitalii Tsygichko—a retired colonel and scholar who was directly involved in the analyses of this era—also speaks to the bureaucratic dynamics of the Soviet system in this era and to these dynamics' influence on assessments and forecasts. In the late 1970s, Tsygichko was tasked with conducting an analysis to validate a decision that Soviet leadership had already made—that of deploying troops to the Soviet-Chinese border. He noted that the research was commissioned “to support the position of the General Staff and provide a serious scientific basis for the adopted decision.”³⁴ When the study's conclusions discredited the leadership's earlier decision, contending that China did not pose a threat for a host of reasons including its insufficient transportation system (see following section), Tsygichko noted that they were “accepted by the General Staff” and the political leadership but ultimately “did not affect the earlier-adopted decision.”³⁵ Although he acknowledges the role of politics at the senior levels of Soviet leadership, Tsygichko argues that those at the senior staff level approached research through a scientific lens, rather than politically or ideologically.

Despite the reported centrality of its work, the 10th Directorate's existence was short-lived. In 1976, just five years after the directorate's creation, the MOD established the Central Scientific Research Institute of Military-Technical Information (*Tsentralnyi institut voenno-tekhnicheskoi informatsii*, or TsIVTI), which was located within the 6th Central Scientific Research Institute of the MOD (TsNII-6 MO),

³² Shlykov, 2001.

³³ Shlykov, 2001.

³⁴ V. N. Tsygichko, *Models in the System of Strategic Decisions in the USSR*, Moscow: LAP LAMBERT Academic Publishing, 2017, p. 22.

³⁵ Tsygichko, 2017, p. 24.

“to research and forecast the military potential of foreign countries.”³⁶ Throughout the remainder of the Cold War, TsIVTI expanded to include departments intended for the study of military, scientific-technical, and military-economic potentials of countries. With the addition of the new institute whose work focused on the same issues, the 10th Directorate of the GRU was disbanded in 1978. As of 2017, TsIVTI was known as the Center for the Study of the Military Potential of Foreign Countries.³⁷

Other Soviet institutions were also responsible for assessing foreign states’ military-economic potential in the Soviet era. For instance, in addition to OTEI, other departments within IMEMO conducted research related to foreign military-economic potentials, or on related issues such as economic or political analyses of the United States and the West.³⁸ Following a decision to refocus the purview of IMEMO’s work on examining Western states specifically in 1967, IMEMO established a unit to study the U.S. economy.³⁹ Shortly thereafter, the unit published an assessment of the U.S. economy under then-director Nikolai N. Inozemtsev. Though critical of some elements of the U.S. capitalist system, Inozemtsev’s work identified significant strengths in the U.S. economy. This analysis resulted in his conclusion that “no capitalist country can count on reaching par with [the United States] in economic indices in the near future.”⁴⁰ Moreover, of particular significance to this chapter’s focus, Inozemtsev found the strength of the U.S. economy to be particularly significant given its implications for U.S.

³⁶ “6 TsNII MO RF – 55 let,” *Voennaia mysl’*, No. 11, 2017; Haslam, 2015, p. 268; John G. Hines, Ellis Mishulovich, and John F. Shull, *Soviet Intentions 1965–1985*, Vol. I: *An Analytical Comparison of U.S.-Soviet Assessments During the Cold War*, McLean, Va.: BDM Federal, MDA903-92-C-0147, September 22, 1995, p. xviii; and Vladimir Ivanov, “Samye informirovannye liudi v GRU,” *Nezavisimoe voennoe obozrenie*, October 12, 2012.

³⁷ “6 TsNII MO RF – 55 let,” 2017.

³⁸ Central Intelligence Agency, *Survey of Soviet Economists and Economic Research Organizations*, December 1968.

³⁹ Central Intelligence Agency, 1968.

⁴⁰ Schwartz, 1980.

military potential, finding that “thanks to its economic and military might, the position of the U.S.A. . . . is that of a kind of ‘superpower.’”⁴¹

A 1975 National Intelligence Estimate (NIE) described the process and output of Soviet assessment of the United States.⁴² According to the NIE, in addition to a host of sources—including military intelligence and the Committee for State Security (KGB)—the primary civilian institutes for the study of the United States were IMEMO and the Institute of the USA and Canada.⁴³ The primary areas of focus of the combined intelligence and assessment bodies at that time included U.S. military posture, politics and society, military capabilities and intentions, economic condition, and trends in foreign policy. The NIE summarized the Soviet assessment as follows:

Soviet leaders, comparing their own domestic and international positions with those of the U.S., believe that the balance sheet is changing in the USSR’s favor. Despite problems of their own and the greater realism in Soviet thinking that has accompanied the USSR’s expanded involvement in world affairs, Soviet leaders remain convinced that their system will, by degrees, ultimately predominate. But there are important areas—economic, technological, military, and diplomatic—in which they continue to believe the U.S. has great strengths and the capacity to maintain vigorous competition with the USSR.⁴⁴

Late 1970s: End of the Cold War

Soviet efforts to conduct assessments and forecasts of foreign states’ military and military-economic potential did not subside as a result of the dissolution and reorganization of the entities discussed previously, but rather continued in the late 1970s and 1980s. It is not clear that these studies were part of annual programs—as was the case previously—and the several cases we know about appear to have been

⁴¹ As cited in Schwartz, 1980, pp. 9–10.

⁴² Director of Central Intelligence, 1975, pp. 1–18.

⁴³ Director of Central Intelligence, 1975, p. 18.

⁴⁴ Director of Central Intelligence, 1975, p. 1.

commissioned to address specific concerns. According to Tsygichko, the publication of an American book that compared the relative strengths of the Soviet and U.S. economies served as the catalyst for one Soviet analysis in the early 1980s.⁴⁵ The American book, which was published in 1978, did not offer rosy projections for the Soviet economy. Scholars from various institutes within the Russian Academy of Sciences, including Tsygichko, were tasked with conducting an analogous study to test the book's findings with support from the GRU.⁴⁶ According to Tsygichko, the conclusions of the Soviet study—which were delivered in 1984—largely mirrored those of the American text, finding, “Soviet [gross national product] GNP was estimated to be at around 40% of the size of the U.S. GNP, and the gap between U.S. and Soviet output was widening at a nonlinear rate.”⁴⁷

Tsygichko was also commissioned to lead a study aimed at reevaluating China's military potential in 1979.⁴⁸ The study was overseen by the GRU's NII-6 (also referred to as TsNII-6 MO), but, like many of the other Soviet-era efforts, involved analysts from institutions across the Academy of Sciences. The analysis was finalized in 1985 and found that China “did not pose a serious threat” to the Soviet Union. Its forecast determined that for the 15 years projected, China did not possess the “military-industrial capacity [nor] the infrastructure to threaten the USSR.”⁴⁹ In an interview, Tsygichko noted that neither the GRU nor the General Staff leadership initially supported the study's conclusions because the conclusions were perceived as underestimating the military threat posed by China. The MOD ultimately backed the study because of the interest from high-level Soviet political institutions.⁵⁰ However, it is important to note the similarities in the Soviet military establish-

⁴⁵ John G. Hines, “Summary of Interview: Dr. Vitalii Nikolaevich Tsygichko,” in *Soviet Intentions 1965–1985*, Vol. II: *Soviet Post-Cold War Testimonial Evidence*, McLean, Va.: BDM Federal, MDA903-92-C-0147, September 22, 1995, p. 152.

⁴⁶ Hines, 1995, p. 152.

⁴⁷ Hines, 1995, pp. 152–153.

⁴⁸ Hines, 1995, p. 153.

⁴⁹ Hines, 1995, p. 154.

⁵⁰ Hines, 1995, p. 154.

ment's reactions to this study and to those studies led by OTEI, which were also thought to have underestimated foreign states' power and potential.

Post-Soviet Period

The history of Soviet or Russian assessments and forecasts of state power in the late 1980s and 1990s is less well known. Recent references to the continued existence of some of the Soviet-era institutions responsible for such assessments and forecasts indicate that they still conduct this work. For instance, the Central Scientific Research Institute of Military-Technical Information survived the collapse of the Soviet Union and was replaced by the Center for Research on the Military Potential of Foreign Countries in 2005 (and then renamed the Center for the Study of Military Potential of Foreign Countries in 2012).⁵¹ Likewise, IMEMO scholars continue to produce annual analyses and longer-term forecasts on the status of foreign states' economies and their foreign policy behavior.⁵² It is unclear how similar these are to Soviet-era analyses produced by IMEMO because the Soviet-era analyses were classified and those produced today are not.

We observed several continuities between the Soviet era, early post-Cold War period, and contemporary period in terms of the conceptions of state power and related terms, as well as in assessments and forecasts used to appraise states' comparative strength. First, most of the scholarship from all of these periods includes economic, military, political, and in some cases cultural, moral, or spiritual components in their conceptions of state power or military potential. Likewise, it also appears that in these periods, state-affiliated institutions from both the military establishment and the scientific community have been

⁵¹ Some of the evidence we identified indicates that an organization named the Center for Studies on the Military Potentials of Foreign Countries existed as of 2018, because some Russian military journals listed this institution as authors' organizational affiliation. See B. B. Kruglov, "Redaktsionnaya kollegiya," *Voennaia mys'*, No. 7, 2018, p. 24. Also see Ivanov, 2012.

⁵² See, for instance, I. Korbrinskaya and G. Machavariany, eds., *Russia and the World: 2019. IMEMO Forecast*, Moscow: IMEMO, 2019; and A. A. Dynkin and V. G. Baranovsky, *Russia and the World: 2019. Annual Forecast: Economy and Foreign Policy*, Moscow: Institute of World Economy and International Relations, 2018.

involved in studies examining these issues, sometimes working in concert, and at other times competing.

Contemporary Conceptions of State Power and Military Potential

State Power and Its Role in the Context of Russia's Strategic Perceptions

In the context of the increasingly globalized world and the geopolitical confrontation within it, Russian military and scientific scholars continue to believe in quantitative and qualitative decisionmaking frameworks that can be applied to identify military planning and acquisition priorities. These scholars consider the assessment and forecasting of the foreign and domestic political situation, as well as the identification of military threats, as the theoretical starting points in organizing the resources and activities of the Russian state.

As discussed in Chapter One, various Russian research institutes have conducted assessments and forecasts with relevance to determining the level of military security of Russia in the 2000s. The main components of their methodologies are

- categories and indicators used to assess and predict the future of the international and military-political situation
- the magnitude of military threats to the military security of the state
- the aggregate resources and military capabilities of states.

The aim of these analyses is to assess and forecast Russia's relative position vis-à-vis other states; highlight the strengths and weaknesses of Russia's military, economic, political, and moral potential; and provide recommendations for the military organization of Russia's armed forces in ways that strengthen national security.

A central term in Russian strategic forecasts and assessments is the concept of *state power*, which is defined in Table 3.1.⁵³ The concept of state power most frequently is used to assess the ability of the state to deploy resources for its defense and to exert influence abroad.⁵⁴ Much of the scholarship we examined conceived of military power (*voennaia moshch'* or *voennaia sila*) and, most often, military potential as integral components of military forecasting (see Table 3.1 for a definition of the term).⁵⁵ Some of the scholars consider military power and potential to be the most important components of the models, and state power is primarily dependent on military power.⁵⁶ In other models, military power is thought to be equally important to other categories, such as political and economic power.⁵⁷ Although Russian scholars vary in the number of components they include as contributing to state power and military power, they tend to include a military, political, economic, scientific-technical, informational, and a moral or cultural component.⁵⁸ Table 3.1 outlines the main concepts used in Russian assessment and forecasting analyses as defined by various Russian scholars.

The conceptual frameworks that Russian scholars propose for assessing and forecasting state power also differ in the relative impor-

⁵³ Some of the scholarship conceptualizes these terms similarly to three other terms—aggregate state power (*sovokupnaja moshch' gosudarstva, obshchaia moshch' gosudarstva*), network power (*setevaja moshch'*), and national power (*natsional'naia moshch'*). See for example, A. I. Buravlev, "K voprosu ob otsenke moguchestva gosudarstva," *Vooruzhenie i ekonomika*, No. 1, 2016; Andrei Afanas'evich Kokoshin, "Rossiya v mire. ROSSIYA - Sverkhderzhava, Velikaya ili Regional'naya Derzhava?" *Mezhdunarodnaia zhizn'*, No. 9, 2002; Andrei Afanas'evich Kokoshin, "'Nekotorye makrostrukture izmeneniya v sisteme mirovoy politiki. Tendentsii na 2020-2030-e gody,'" *POLIS. Politicheskie issledovaniia*, No. 4, 2014; A. Kh. Shavaev, "Voennaia moshch' gosudarstva i ee vzaimosviaz' s politikoi," *Voennaia mysl'*, No. 3, 2010; Burenok, 2018b; and Podberezkin, 2015, p. 544.

⁵⁴ Burenok, 2018b, p. 85.

⁵⁵ See for example, Shavaev, 2010; and Burenok, 2018b, p. 301.

⁵⁶ Shavaev, 2010, p. 58.

⁵⁷ Buravlev, 2016, pp. 23–24.

⁵⁸ A. I. Ageev, G. Mensch, and R. Matthews, eds., *Global Rating of Integral Power of 100 Countries 2012*, 3rd ed., Moscow: International Futures Research Academy, Institute for Economic Strategies, 2012, p. 7; and Burenok, 2018b, pp. 298–299, 306.

Table 3.1
Main Concepts Used to Assess and Forecast State Power and Military Potential

Concept	Definition
Potential	The maximum available resources that a state can mobilize and use to achieve a specific policy goal.
Power	The portion of potential (whether economic, military, political, or otherwise) that the state has realized.
State power	A measure of the capacity of a state to employ available resources in the military, economic, or political spheres.
Network power	A state's ability to influence international developments in political, economic, military, informational, cultural, and other spheres.
Network potential	The "mobilized national potential within the country and abroad." ^a
Military power	"The totality of all material and spiritual forces constantly involved in wartime and peacetime, the ability of the state to mobilize all forces for warfare (repulsing aggression)." ^b
Military potential	The "maximum share of all realized parts of its (state's) total potential, which it can allocate for the formation and buildup of its military power." ^c
Military-economic potential	"The real ability of the economy to meet the needs of the state's military organization, strategic deterrence forces, and general forces." ^b
Military-political potential	"The real ability of the state and society to mobilize the capabilities of the population to protect the national interests, sovereignty, and territorial integrity of the country." ^b

SOURCES: Shavaev, 2010, pp. 59, 60–65; Burenok, 2018b, p. 85; Podberezkin, 2015, p. 587; "K 70-letiiu so dnia rozhdeniia kandidata voennykh nauk dotsenta general-maiora Sambu Rabdanovicha Tsyrendorzhieva," *Vooruzhenie i ekonomika*, Vol. 1, No. 47, 2019, pp. 4–5; Tsyrendorzhiev, 2014, pp. 30, 33; and V. N. Gorbunov and S. A. Bogdanov, "Ekonomicheskii potentsial – osnova oboronsposobnosti gosudarstva," *Voennaia mysl'*, No. 4, 2009, p. 41.

^a Podberezkin, 2015, p. 587.

^b Tsyrendorzhiev, 2014, pp. 30, 33.

^c Shavaev, 2010.

tance they ascribe to each component and the relationship between them (see Table 3.2 for an example of indicators that Russian military scholars use to assess state power and potential).⁵⁹

One of the most detailed lists of categories and indicators used to assess the value of military potential is provided by another group of scholars in Burenok (2018b). These authors use the same general categories as Tsyrendorzhiev in his 2014 publication and argue that military potential is a generalized assessment of the military-economic, military-political, and armed forces potential (see Table 3.3).⁶⁰

Much like the argument put forth by Shavaev, the authors in Burenok (2018b) emphasize that the spiritual component of the state, its population, and its military can serve as an indicator of the level of morale of the population, and plays a key role in achieving economic, social, military, and political objectives. This spiritual dimension influences all components of a state's military potential, affecting a state's rate of development and efficiency.⁶¹

The previous discussion demonstrates that although the terminology is not consistent, with some exceptions the same factors are considered whether the analyst is examining state power, aggregate potential, military power, or military potential. Because there is an official center within the MOD dedicated to the study of military potentials of foreign countries and the center's history dates to the early 1960s, it is our view that *military potential* is the most officially accepted term in the area of Russian military forecasting.

Assessment and Forecasting Methods and Outcomes

The relevant scholarship appraises Russian and foreign states' power, potential, and related concepts using a variety of methods, including statistical modeling, expert-analytical methods, and scenario-based

⁵⁹ Buravlev, 2016; Tsyrendorzhiev, 2014; Burenok, 2018b; Podberezkin, 2015; and Shavaev, 2010.

⁶⁰ Burenok, 2018b, p. 300.

⁶¹ Burenok, 2018b, p. 135.

Table 3.2
Indicators Used to Assess State Power or Potential

Indicators	Factors Assessed for Each Indicator
Territory	• Total area • Territory's latitudinal and longitudinal dimensions (length from north to south and east to west) • Useable and habitable proportion of the territory (adjustment for climate conditions and specifics of the terrain) • Length of land and sea borders
Natural resources	• Supply and access to mineral resources and water resources • Condition of land resources • Level of climate advantages for human life activity • Level of protection of the territory against hazardous natural phenomena • Development level of recreational resources and landscape infrastructure
Population	• Population size • Population's health status • Age-sex structure of the population • Ratio of urban to rural population
Economy	• Volume of gross domestic product (GDP) (including per capita) and GNP • Share of the global economy that the state's economy holds • Positive or negative trade balance • Purchasing power parity of national currency • Characteristics of the major trade partners of the state • Export and import structure
Culture and religion	• Contribution of the state to world culture • Whether the state's territory is home to monuments of regional or global cultural significance • Extent to which the state's religious centers influence world religions • Extent of interfaith relations
Science and education	• Development level of critical technologies • Complexity of scientific-technological development of the country • Development level of information technologies • Number studying at higher educational institutions per 1,000 people in the country • State's compliance with global education standards • Share of literate population • Existence of obligatory secondary education

Table 3.2—Continued

Indicators	Factors Assessed for Each Indicator
Army (Armed Forces)	• Existence and development extent of strategic nuclear forces, and forces' sea, land, and aviation components • Development level of general purpose forces • Development of the control and communication systems that determine the ability of armed forces to function as a single combat system • Degree to which state's forces are equipped with precision weapons
Foreign policy	• Consistency • Offensive level • Compliance with national interests
Management and governance	• Sustainability • Adaptability • Ability to lead • Public trust • Effectiveness of elite formation • Burenok (2018b) also includes consistency in achieving goals

SOURCES: Compiled from Ageev, Mensch, and Matthews, 2012, p. 7; and Burenok, 2018b, pp. 298–299.

analysis. The studies that employ scenario-based analysis use this method as a means of evaluating the likelihood that each of the proposed scenarios will come to fruition, and to identify the relative status, power, or potential of specific states in each of the scenarios. Though there are differences across studies regarding the number of plausible scenario types, the scenario types themselves are largely similar, as will be discussed in the following section.

Military-Scientific Assessment and Forecasting Methods and Outcomes

Scenario-Based Assessments and Forecasts

Several of the studies we surveyed also examined states' power and potential through the lens of future scenarios. Each of the assessments and forecasts we surveyed used a combination of the forecasts described in Table 2.1, including intense globalization, moderate globalization, regionalization, chaos, bipolarity 2.0, and rise of China scenarios. For

Table 3.3
Selected Categories and Indicators of Military Potential

Military-Political Potential	Military-Economic Potential	Armed Forces Potential^a
Number of employed people	Overall economic development	Overall manpower of armed forces
Average life expectancy of the population	GDP	Mobilization potential
Fertility rate	Population	Combat potential of Ground Forces
Overall literacy (as percent of the total population)	Territory	Combat potential of Navy
	Condition of labor resources	Combat potential of Aerospace Forces
	Raw materials and energy potential	Effectiveness of the armed forces
		Expenditures on national defense
		Scientific-technical potential of the state

SOURCES: Burenok, 2018b, pp. 133–134, 301; and Tsyrendorzhiev, 2014, p. 33.

^a According to the researchers who constructed this framework, strategic nuclear forces are considered separately as part of the assessment or forecast of the effectiveness of strategic deterrence.

a comparison of the scenarios used in the assessments and forecasts we surveyed, see Table 3.4.

Although there is some variation in the scenarios themselves, all of the work we examined included the *intense globalization*, *moderate globalization*, and *regionalization* scenarios in some form. Both the *intense globalization* and *moderate globalization* scenarios project that the United States will maintain its position as global economic and military leader, along with the West as a whole.⁶² Under the intense globalization scenario, the gap between the West and other states will

⁶² Ageev, Mensch, and Matthews, 2012, p. 60.

Table 3.4
Common Scenarios Used in Assessments and Russian Forecasts of State Power, Military Potential, and Military Threat

Author(s)	Scenario Types					Rising China
	Harsh Globalization	Moderate Globalization	Regionalization	Chaos	Bipolarity 2.0	
Ageev and Kuroedov, 2008	X	X	X	X		
Ageev, Mensch, and Matthews, eds., 2012	X	X	X	X		
Tsyrendorzhiev, 2015	X	X	X	X	X	
Tsyrendorzhiev and Kuroedov, 2017	X	X	X		X	X
Dynkin, ed. 2017	X	X	X		X	
Burenok, 2018b	X	X	X		X	X
Strategic Forecast 2019 (Patrushev, 2019)	X	X	X		X	

SOURCES: Compiled based on Ageev and Kuroedov, 2008; Ageev, Mensch, and Matthews, 2012; Tsyrendorzhiev, 2015; Dynkin, 2017; S. R. Tsyrendorzhiev and B. V. Kuroedov, "Perspektivy razvitiia Sistemy mezhdunarodnykh otnoshenii i uslovii obespecheniia voennoi bezopasnosti Rossiiskoi Federatsii," *Voennaia mysl'*, No. 6, 2017; Burenok, 2018b; and Patrushev, 2019.

NOTE: Some of the studies included use slightly different titles for these scenarios.

continue to grow, whereas under moderate globalization, the West is not projected to maintain a monopoly on power, which will allow other non-Western centers of power to emerge.⁶³ The moderate globalization scenario is more favorable to Russia and the Eurasian region because Russia would have the opportunity to emerge as a power center if the region's states integrate by establishing economic and military-political alliances and unions.⁶⁴

By contrast, in the *regionalization*, *bipolarity 2.0*, and *rise of China* scenarios, the existing Western-led international order is unseated. These scenarios differ based on their projections of how and to whom power would be redistributed. In the *regionalization scenario*, the Western-led order is replaced by a system in which power is held by several competing regions.⁶⁵ According to *bipolarity 2.0*, power is recentered around two poles, including: (1) the West and some former Soviet states and (2) Brazil, Russia, India, China, and South Africa (BRICS).⁶⁶ Relatedly, the *rise of China* scenario projects that China rises to assume the mantle of global leader.⁶⁷ The outlier is what Ageev, Mensch, and Matthews (2012) refer to as the *chaos scenario*. This future is marked by a series of catastrophic events, such as terrorist attacks, that result in instability in the international system.⁶⁸

It is equally important to know which scenarios Russian scholars identify as most likely to come to fruition, and those which are most favorable to Russia. Tsyrendorzhiev and Kuroedov find that the intense globalization scenario is the most likely to come to fruition, but is also the most threatening to Russian interests and security in the national security and defense sphere because Russian power is projected to decrease and U.S. and Chinese power is projected to increase in this

⁶³ Ageev, Mensch, and Matthews, 2012, p. 60.

⁶⁴ Ageev, Mensch, and Matthews, 2012, p. 61.

⁶⁵ Ageev, Mensch, and Matthews, 2012, p. 61.

⁶⁶ Tsyrendorzhiev and Kuroedov, 2017, p. 13.

⁶⁷ Burenok, 2018b, p. 352.

⁶⁸ Ageev, Mensch, and Matthews, 2012, p. 61.

scenario.⁶⁹ Tsyrendorzhiev and Kuroedov argue that the bipolarity 2.0 and regionalization scenarios are the most favorable to Russia, followed by the rise of China and moderate globalization scenarios, and that bipolarity 2.0 is the second most likely scenario to come to fruition.

The 2018(b) Burenok study, which assesses the relative rankings of the military-political potential of leading world countries, also finds that the United States is likely to maintain its position of power in the international system across all periods (2018, 2025, 2040) and scenarios, except for in the 2040 rise of China and bipolarity 2.0 scenarios, in which cases China takes the lead. In all scenarios, Russia maintains third place or lower. Burenok (2018b) also finds that the United States and China rank higher in terms of their military-political potential than does Russia, based on an examination of these states' current capabilities. The assessment also indicates that Russia is superior in terms of its spiritual potential.⁷⁰

Similarly, Ageev and Kuroedov find that the United States ranks highest of the countries examined in the armed forces category. Although Russia ranks second in this category, the authors further argue that the gap between Russia and the United States on these indicators is widening.⁷¹ It is important to note that this analysis predates many of the Russian military's major modernization and professionalization efforts. Thus, if conducted at the time of this writing, the outcomes of Ageev and Kuroedov's analysis could be different in this area because of these reform efforts.

It is important to note that all of these assessments and forecasts conclude that the United States is strong militarily and economically and will likely continue on this trajectory in the future. Overall, Russia is assessed to hold an inferior position to that of the United States and China.

⁶⁹ Tsyrendorzhiev and Kuroedov, 2017, p. 16.

⁷⁰ Burenok, 2018b, pp. 300–305.

⁷¹ Ageev and Kuroedov, 2008, pp. 236–237.

Civilian Scientific Community's Appraisals of Russian, U.S., and Chinese State Power

The Russian civilian scientific community has also weighed in on the issue of state power and on Russia's position in the international system relative to other major powers. Because of the integral role of Russian scientific institutions like IMEMO in assessing and forecasting foreign states' power throughout the Soviet era, we thought that it is critical to examine these institutions' recent contributions on this subject. Unlike with the military-scientific studies we examined, these studies took a more qualitative approach. Interestingly, findings in many cases broadly mirrored those of the military-scientific literature.

Several of the texts we examined agreed that East Asia, notably China, has emerged as an increasingly important power center in the international system.⁷² The exception is IMEMO's 2019 annual forecast *Russia and the World*, which predicts that China's economic progress will slow in the near term as will the growth of developing states' economies.⁷³ The U.S.-China trade war, the IMEMO report finds, will "push China to a closer economic, political and military cooperation with Russia."⁷⁴ By contrast, several of the analyses agree that Russia's economy does not rival that of the United States or China as of this writing, nor will it in the future, however, these analyses cite Russian access to energy resources as Russia's one economic strength.⁷⁵

Interestingly, several authors cite other intangible factors as areas in which Russia possesses an advantage. These include "the moral spirit of a nation," and a state's historical memory.⁷⁶ K. Gajiev, a research associate at IMEMO, contends that Russia's long history, values,

⁷² Y. Gajiev, "Superpower Status: An Outgoing Phenomenon in the 21st Century," *International Affairs*, Vol. 6, No. 63, 2017; A. Frolov, "Centers of Power and Multipolarity: A View Through Time," *International Affairs*, Vol. 1, No. 63, 2017; and Iu. Raikov, "East Asia and the New World Order," *International Affairs*, Vol. 1, No. 62, 2016.

⁷³ I. Kobrinskaya and G. Machavariany, eds., *Russia and the World: 2019. IMEMO Forecast*, Moscow: IMEMO, 2019, p. 94.

⁷⁴ Kobrinskaya and Machavariany, 2019, p. 105.

⁷⁵ Kobrinskaya and Machavariany, 2019, p. 94; and Frolov, 2017, p. 125.

⁷⁶ Gajiev, 2017, p. 4; and Frolov, 2017, pp. 125–126.

and people form a “spiritual shield,” which is as critical to protecting Russia’s security as is its material resources or military capabilities.⁷⁷ A. Frolov puts forth a similar argument, asserting that Russia possesses a unique element that contributes to its state power and its historical memory. He argues that this makes up for other Russian deficiencies, noting that

Russia possesses much poorer economic resources than the United States or China but there is [a] powerful weapon in its foreign policy arsenal—historical memory. There are strong pro-Russian sentiments in many of the countries that maintained friendly relations with the former Soviet Union and received assistance from it. So Russia has far from used up its role as a consolidating center of power.⁷⁸

Gajiev and Frolov’s assertions are significant in that they mirror the inclusion of moral or social potential as a contributor to state power in the military-scientific assessments discussed earlier in this chapter.

Overarching Themes of Assessment and Forecast Findings

Although the studies we examined employed different methods to assess and forecast countries’ state power, we found that there were some important continuities across the studies’ findings. The assessments and forecasts we examined generally rank the United States in the first position overall in terms of state power, both as of this writing and in the future. However, they tend to find that U.S. state power either stagnates in the future or declines slightly. Generally, these assessments and forecasts appear to rank Russia and China behind the United States (and sometimes the EU collectively); however, China and Russia’s positions within the ranking fluctuate from assessment to assessment. Russian and Chinese state power, several studies find, will rise in the future but may not catch up with or outpace the United States in the timeframes examined (2035, 2040, and sometimes 2050).

⁷⁷ Gajiev, 2017, p. 4.

⁷⁸ Frolov, 2017, pp. 125–126.

Broadly, these assessments and forecasts rate Russia as weaker economically than China or the United States. Likewise, these analyses do not predict significantly better prospects for the Russian economy in the near term. The one economic sphere in which Russia is seen to possess more strength is its access to natural resources and its territory. The assessments and forecasts also call out Russia's population decline as another point of weakness. Russian military capability is overwhelmingly appraised as a point of strength, though all of the studies that we surveyed nevertheless view the United States as outperforming Russia militarily. Many of the appraisals of Chinese and Russian military strength appear to place Russia and China in similar positions. Some rank Russia as slightly higher, whereas others position China in a slightly higher position.

Although some of the analyses that we examined rank China higher than the United States in terms of economic power, others find the converse to be true. Several authors discuss the positive role that Russians' cultural or moral values play in undergirding national strength. Lastly, because the assessments and forecasts that we examined see Russia as weaker relative to the United States across nearly all considered indicators, and in some cases weaker than China and the EU collectively, this underscores the need for Russia to establish formal partnerships with other CIS members to be able to compete; other analysts, such as Buravlev, find that a strong partnership with China and good relations with other great powers can improve the power dynamics against a Western alliance.⁷⁹

Three of the studies that we examined assigned specific rankings to Russia, China, and the United States in the core categories discussed previously and these rankings are illustrative of the broader trends we observed in the relevant scholarship. Figure 3.1 displays these rankings across these three analyses. That said, these analyses do not employ the same methodology in their analyses, and therefore the specific scores that these analyses assign to each state cannot be compared across analyses. Likewise, the three analyses did not use identical indicators;

⁷⁹ A. I. Buravlev, "K voprosu ob otsenke voenno-ekonomicheskogo potentsiala gosudarstva," *Vooruzhenie i ekonomika*, Vol. 3, No. 40, 2017, p. 96.

Figure 3.1
Selected Scholars’ Rankings of State Power or Military Potential

Author(s)	Period of Assessment	Economic Potential	Military Potential	Political Potential	Moral/ Cultural/ Spiritual Potential	Overall Ranking in Power/ Position
Burenok, 2018b	2018	1. China 2. U.S. 3. Russia	Military-political potential 1. U.S. 2. China 3. Russia		1. Russia 2. U.S. 3. China	1. U.S. 2. China 3. Russia
	2025 (average across scenarios)	Not provided				1. U.S. 2. China 3. Russia
	2040 (average across scenarios)					1. China 2. U.S. 3. Russia
Buravlev, 2016	2016	1. U.S. 2. China 3. Russia	1. U.S. 2. Russia. 3. China	1. U.S. 2. China 3. Russia	Not provided	1. U.S. 2. China 3. Russia
Vinokurov, Kovalev, and Malkov, 2013,as summarized by Kovalev, 2014	2025	Not provided	1. NATO 2. China 3. Russia	Not provided	Not provided	1. NATO 2. China 3. Russia
Ageev, Mensch, and Matthews, eds., 2012	2012	1. U.S. 2. China 3. Russia	1. U.S. 2. Russia. 3. China	1. China 2. U.S. 3. Russia	1. U.S. and China 2. Russia	1. U.S. 2. China 3. Russia
	2030	1. U.S. 2. China 3. Russia	1. Russia 2. U.S. 3. China	1. U.S. 2. China 3. Russia	1. U.S. and China 2. Russia	1. U.S. 2. China 3. Russia

SOURCES: Compiled using the rankings presented in the analysis of Burenok, 2018b; Buravlev, 2016; V. I. Kovalev, “Iadernoe bezopasnosti Rossii v XXI veke,” *Strategicheskaya stabil’nost’*, Vol. 3, No. 68, 2014, pp. 16–17; and Ageev, Mensch, and Matthews, eds., 2012.

NOTE: The data presented in Kovalev (2014) was drawn from previous studies cited in the article’s bibliography, most notably Vinokurov, Kovalev, and Malkov (2013). Different methodologies and terminology applied in each case. We used Ageev, Mensch, and Matthews’ (2012) scores for the indicator culture and religion for the table’s moral/cultural/spiritual potential category.

for instance, we used Ageev, Mensch, and Matthews’ (2012) scores for their indicators of culture and religion for the table’s moral/cultural/spiritual potential category, which may not be an exact analogue to how the other studies conceived of moral/cultural/spiritual potential. Rather, the table is intended to provide a general sense of where each of

the studies positions Russia, China, and the United States, respectively, in state power or military potential.

Table 3.5 presents one example that demonstrates how Russian scholarship, in this case the 2018(b) Burenok study, applies its assessment and forecasting methodology to appraise the military potential of leading countries, including Russia. As noted previously, according to the assessment or forecast, the United States outperforms all of the other leading states (including Russia and China) in all scenarios, except 2040's bipolarity 2.0 scenario. Although Russian military potential ranks higher in specific scenarios—namely the 2025 and 2040 bipolarity 2.0 scenario—it falls further behind U.S. and Chinese military potential scores for all of the scenarios examined. Burenok (2018b) identifies the 2040 bipolarity 2.0 scenario as the most favorable for Russia and least favorable for the United States. The results are more unfavorable for Russia across all scenarios when NATO allies, such as Germany, France, and the United Kingdom, are added to the overall comparison. Viewed through a lens of military potential, Russia has every incentive to reduce the cohesion of the Western alliance and the role of the United States in the international system. Otherwise, as Tsyrendorzhiev emphasized in 2015, Russia “will not be able to play any substantive role in the formation of new power centers and influence the international situation.”⁸⁰

The trajectory of non-NATO countries, such as India, could also be important if we think about Russian interests from a power-balancing perspective. As alluded to previously, Russia will seek to shape a world that is more favorable to its long-term military and national security interests, which include building friendly relationships and weakening competitors. The military potential forecast is one way to consider how Russia is thinking about the future and might seek to push back against unfavorable countertrends in international relations. Because so many of the sources we examined in the research for this report discuss the importance of globalization, we speculate that Russia will seek to actively resist the “intense globalization” sce-

⁸⁰ Sambu Tsyrendorzhiev, “Prognoz voennykh opasnostei i ugroz Rossii,” *Zashchita i bezopasnost'*, Vol. 4, 2015, p. 11.

Table 3.5
Military Potential of Leading VPO Actors Under Different Scenarios

Country	2018	2025 (Intense Globalization)	2025 (Bipolarity 2.0)	2040 (Intense Globalization)	2040 (Bipolarity 2.0)
United States	7.49	7.83	7.40	8.41	7.25
China	6.53	6.50	6.89	6.46	7.50
Russia	5.31	5.18	5.64	4.98	6.21
India	4.91	5.04	5.13	5.27	5.49
Japan	4.04	4.20	4.19	4.47	4.45
Germany	3.82	3.93	3.98	4.13	4.25
France	3.57	3.55	3.69	3.52	3.89
United Kingdom	3.53	3.67	3.64	3.88	3.81
Iran	3.27	3.19	3.46	3.07	3.78
Turkey	3.21	3.40	3.34	3.73	3.56
Brazil	3.06	3.13	3.25	3.24	3.56
South Africa	2.08	2.12	2.16	2.19	2.29

SOURCE: Burenok, 2018b, pp. 304–305.

NOTE: *Intense globalization* is assessed by Burenok (2018b) to be the least favorable VPO scenario for Russia's comparative military potential through 2040; *Bipolarity 2.0* would be the most favorable in both 2025 and 2040. Other scenarios lie in between these extremes. The scores given to each country for each scenario category (columns) are not additive, but rather are intended to be viewed as discrete assessments for each of the time periods or scenarios examined.

nario, which envisions an advantageous position for the United States to the detriment of such countries as Russia and China, which are not satisfied with the status quo.

Conclusion

This chapter demonstrates that parallels exist between Soviet and Russian thinking about the factors that contribute to a state's relative power and its position in the international system. Likewise, our research found that, in both the Soviet and contemporary periods, analyses of state power and related concepts have been the product of both military and civilian-scientific institutions affiliated with the state, and in some cases these communities have worked together to understand where Russia stands compared with its allies and adversaries. In other cases, these institutions have competed. This points to a potential distinction between the two periods. In the Soviet era, assessments and forecasts of state power appear to have been mandated by Soviet leadership. As a result, the outputs of these assessments were often sent to senior decisionmakers. By contrast, we do not know how prominent recent work on state power is, nor do we know how influential it is within the Kremlin. But this research revealed a continuity in Soviet and contemporary Russian thinking on the conceptual components that contribute to a state's power and potential. Scholars from both eras largely agree on the main components that comprise state power or military potential, including military, economic, political, and moral/cultural/spiritual dimensions.

Furthermore, several overarching themes from the outcomes of recent Russian assessments and forecasts of state power have emerged. First, Russian appraisals find that Russia sits in an overall inferior position compared with the United States and China (and with India by 2040, in some scenarios) both as of this writing and in the future across the conventional military, political, and economic domains.⁸¹ The analyses we examined ranked Russian military power and potential as

⁸¹ Burenok, 2018b, p. 305.

higher than Chinese military power and potential in some instances, but as lower than that of the United States overall. Many of the recent Russian analyses include a moral/spiritual/cultural element of state power—a sphere in which Russia ranks higher than China in some cases. Lastly, some of the recent Russian examinations of plausible future scenarios find that those in which the United States remains a dominant player in the international system are most likely to come to fruition.⁸² Interestingly, this finding contradicts much of the Russian state's recent public rhetoric, which asserts that the West, including the United States, is in decline.

⁸² Tsyrendorzhiev and Kuroedov, 2017, p. 16.

Assessing and Forecasting Critical Technologies

Introduction

In the Soviet era, the level of military technology development had been a cornerstone of strategic competition between the Soviet Union and the United States.¹ The collapse of the Soviet Union and economic decline of 1990s has led to the deterioration of Russia's technological base. This problem was quickly recognized, both by the scientific community and policymakers, as illustrated in the Concept of National Security of 1997:

The weakening of the country's scientific, technical, and technological potential, the reduction of research in strategically important areas of scientific and technological development, [and] the outflow of specialists and intellectual property abroad threaten Russia with the loss of leading positions in the world, the degradation of science-intensive industries, the strengthening of external technological dependence, and the undermining of Russia's defense capabilities.²

However, it was not until the launching of modernization initiative in 2008–2009 by then-President Dmitry Medvedev when Rus-

¹ Robert L. Perry, *Comparisons of Soviet and U.S. Technology*, Santa Monica, Calif.: RAND Corporation, R-827-PR, 1973.

² President of Russia, "Ukaz Prezidenta Rossiiskoi Federatsii ot 17.12.1997, No. 1300: Ob utverzhdenii Kontseptsii natsionalnoi bezopasnosti Rossiskoi Federatsii," Moscow, December 17, 2012b.

sian policymakers started a serious discussion about reinvesting in high technology. The goal of this modernization program was to change the structure of the Russian economy to decrease its dependency on raw materials export. In that respect, the program has shown little success: Fossil fuels remain the main export product and high-technology manufacturing exports have not reached the 3 percent threshold set out by the modernization program. Nevertheless, innovation and rebuilding of the scientific and technological base of the military-industrial complex became one of state's priorities.

In the late 2000s, military literature on weapon-development planning was motivated by a general notion of U.S. technological superiority, on the one hand, and scarce financial resources, on the other.³ In the last few years, the literature began to reflect a growing belief that the political and economic situation within Russia continues to deteriorate and called for the development of a full cycle of research, development, and production of rigorously selected new prospective weapons and military equipment. Korchak et al. (2017) asserted that because of the disparity in research budgets between the United States and the Russian Federation, Russia cannot compete with the United States across the spectrum of weapons and military equipment and consequently has to concentrate its resources on a limited number of crucial technological areas, which in the future could ensure strategic advantage.⁴ The proposals of Sergei Pankov, who is the Chief of the Directorate of Prospective Research and Special Projects of the MOD in the area of applied defense research planning, were motivated by the growing tensions on the Russia–North Atlantic Treaty Organization (NATO) border, plunging oil prices, and Western sanctions, the latter

³ V. M. Burenok, ed., *Razvitie voennykh tekhnologii XXI veka: problem, planirovanie, realizatsiia*, Moscow: KUPOL Publishing House, 2009, pp. 158–160.

⁴ Vladimir Korchak, Aleksei Kravchenko, Sergei Smirnov, and Roman Reulov, "Programmno-tselevoe planirovanie razvitiia bazovykh voennykh tekhnologii na sovremennom etape," *Vooruzhenie i ekonomika*, Vol. 41, No. 4, 2017, p. 14.

of which broke some of existing supply chains of weapons and military equipment production (i.e., shrinking resource base).⁵

In this chapter, we aim to understand the comparative assessment of technological development across countries and its role in the selection planning process.⁶ We base our analysis on policy documents and scientific literature on State Armaments Program (SAP) planning, on the basic and fundamental research for military purposes, and on the military-industrial complex and its scientific and technological base. In our analysis, we focus mostly on the determination of critical military technologies. How these technologies are incorporated into the decisionmaking on further applied research, prototyping, and procurement is a potential area of future research.

Critical Military Technologies

The current edition of the List of Basic and Critical Military Technologies for the period up to 2025 was approved by the Decision of the Military-Industrial Commission under the Government of the Russian Federation of May 25, 2016. The list contains nine basic, 48 critical, and 330 military technologies.⁷ The entire list is not publicly available, except for basic military technologies and the quantity of corresponding critical and military technologies, which are as follows:

⁵ Sergei Pankov, Igor' Borisenkov, Sergei Smirnov, and Roman Reulov, "Planirovanie fundamental'nykh i prikladnykh issledovaniy v interesakh oborony i bezopasnosti gosudarstva v sovremennykh usloviyakh," *Vooruzhenie i ekonomika*, Vol. 39, No. 2, 2017, p. 43.

⁶ See Appendix C for information on how the selection of research areas and technologies is conducted and the policy framework, methods and criteria of choice, and institutions involved in the selection process.

⁷ Based on Burenok's (2009, pp. 153–155) discussion on critical technologies, it appears that *critical technologies* here are "macro-technologies," i.e., broad technological fields, while *military technologies* are "micro-technologies," i.e., particular applications of critical technologies. The example Burenok uses is "laser technology" as a macrotechnology, whereas "tactical laser weapon based on chemical lasers" would be a microtechnology.

- inflicting damage on manpower; military installations; infrastructure; and weapons, military, and special equipment (WMSE): ten critical technologies (CTs) and 75 military technologies (MTs)
- protection of troops, military facilities, infrastructure, and WMSE: three CTs and 32 MTs
- providing mobility, maneuver of forces and means: four CTs and 45 MTs
- intelligence and situational awareness: six CTs and 43 MTs
- navigation and targeting: five CTs and 17 MTs
- C2: seven CTs and 43 MTs
- ensuring sustainment of personnel: three CTs and 16 MTs
- maintenance and restoration of WMSE: six CTs and 37 MTs
- development and use of WMSE: four CTs and 22 MTs.⁸

Kravchenko et al., and Smirnov and Reulov mention nine out of ten critical technologies belonging to the first category in the previous iterations of the list. Namely, nonlethal weapons, means of information warfare, laser weapons, radio frequency weapons, high-speed kinetic weapons, particle-beam weapons, precision-guided weapons, hypersonic weapons, and materials for increased effectiveness of strike.⁹ In 2014, Pankov reported that the implementation of the List of Basic and Critical Military Technologies was focused on unmanned aerial vehicles (UAVs), electronic warfare, robotic systems of multibranch application, and nontraditional weapons, such as laser, direct-energy, high-speed kinetic, nonlethal, and hypersonic weapons.¹⁰ In 2015, he

⁸ Korchak et al., 2017, p. 16; when compared with the list that was approved in 2013, the current version includes the same number of basic and critical technologies; however, the number of military technologies increased by 37.

⁹ Sergei Smirnov and Roman Reulov, "Problemnye voprosy formirovaniya i ispol'zovaniya perechnya bazovykh i kriticheskikh voennykh tekhnologiy i puti ikh resheniya," *Dvoynye Tekhnologii*, Vol. 2, No. 51, 2010, p. 28; and Aleksei Kravchenko, Sergei Smirnov, Roman Reulov, and Dmitrii Hovanov, "Rol' nauchno-tehnicheskogo zadela v innovatsionnykh processakh sozdaniya perspektivnogo vooruzheniya: problemy i puti resheniya," *Vooruzhenie i ekonomika*, Vol. 20, No. 4, 2012, p. 51.

¹⁰ Sergei Pankov, "Rol' voennykh tekhnologiy v razvitiia sistemy vooruzhenii," *Federal'nyi sbornik: Oboronno-promyshlennyy kompleks*, Vol. 10, 2014, p. 443.

Table 4.1
Primary Directions for Russian Military Technological Innovation as of 2015

Category or Service Branch	Description
Nontraditional weapons	Lasers
	Super-high frequency
	High-speed kinetic
	Nonlethal
	Hypersonic
Innovative technical solutions	Robotic systems with artificial intelligence (AI), including micro-, biosimilar, and biohybrid
	Nontraditional fuel sources
	Intellectual information C2 systems
Air Force	Hypersonic cruise missiles (operational level)
	Reconnaissance-strike systems with long-range UAVs
Aerospace Defense	Laser systems for the destruction of air and space targets
Strategic Nuclear Forces	Air-based laser system for heat destruction of targets
	Aero-ballistic hypersonic missile with multi-module combat loadout
Navy	Sea-based hypersonic cruise missile
	Ship-based electrodynamic "device" (ustanovka)
	Unmanned underwater machines
Ground Forces	Multipurpose combat (strike) robot systems
	Intelligence, surveillance, and reconnaissance (ISR) systems with intermediate- and short-range UAVs

SOURCE: Sergei Pankov, "10 let Upravleniyu. Ot novykh materialov do opytnykh obraztsov perspektivnogo vooruzheniia," *Federal'nyi spravochnik, Oboronno-promyshlennyyi kompleks Rossii*, Vol. 11, 2015.

provided a breakdown of military technology innovation plans by service branch (see Table 4.1). On principle, though, the list of critical military technologies is not publicly available; its content can be only

inferred from policy documents, white papers, public statements of Russian military leadership, and news reports.

As mentioned previously, the list of critical military technologies is implemented, among others, in the SAP. The latest SAP was adopted at the beginning of 2018, for the period of 2018–2027. According to then–Deputy Prime Minister, Dmitrii Rogozin, the new SAP-2027, in addition to including the continued modernization of existing platforms across the Armed Forces, provided for the development of robotics, intelligent systems (AI), strike and reconnaissance UAVs, and precision munitions.¹¹ The Russian newspaper *Izvestiia* reported that another priority of the new armaments program is hypersonic weapons; in broad terms, *Izvestiia* called the SAP-2027 “a program of unmanned vehicles and robots.”¹²

The importance of AI is also marked by the adoption of the National Strategy for the Development of Artificial Intelligence for the period until 2030. Although the strategy does not discuss the use of AI for military purposes, reporting about the SAP indicates that this strategy will benefit the military science and technology sectors.

A growing focus on robotics is evident when we look at the number of documents addressing this issue and institutions tasked with this area of research established in the last few years (see Tables 4.2 and 4.3).

Other military technologies mentioned in strategic-level documents and white papers include

- nanotechnologies
- bio- and genetic technologies
- cognitive, information, and communication technologies¹³
- electronic warfare.¹⁴

¹¹ Dmitrii Rogozin, “Luchshe odin doroogostoiashchii pritsel’nyi udar, chem sto udarov bez razbora,” *Kommersant*, February 26, 2018.

¹² Bogdanov, 2018.

¹³ President of Russia, *Strategiia natsional’noi bezopasnosti*, Moscow, December 31, 2015.

¹⁴ President of Russia, 2014b.

Table 4.2
Robotics-Related Documents

Year	Document	Function
2014	The Concept of Using Military Robotic Systems to 2030	Defines a comprehensive position of the MOD on the use of robotic systems in the near future.
2014	The Comprehensive Target Program "Creation of Advanced Military Robotics Until 2025 With a Forecast to 2030" ("Robotization-2025")	Reflects the main directions for the development of military robotic systems until 2025, based on the needs of the service branches of the Armed Forces. ^a
2015	Robotic Complexes (Systems) of Military, Special and Dual Purpose" Added to the Priority Areas for the Development of Science and Technology in the Russian Federation	

SOURCE: Ministry of Defense of the Russian Federation, "Na Voenno-nauchnoi konferentsii po robototekhnike v pervie pokazhut unikal'nie razrabotki voennogo naznacheniya," press release, February 10, 2016.

^a Vyacheslav Presnukhin, "Soprovozhdenie peredovykh tekhnologii - neobhodimoe uslovie razvitiya innovatsionnoi deyatel'nosti v Ministerstve oborony RF," *Federal'nyi sbornik. Oborono-promyshlennyyi kompleks*, Vol. 11, 2015, pp. 405–406.

Cross-Country Comparison

The comparative analysis of technological development in different countries is an important element in strategic planning. Russian military and foreign policy theorists recognize that the correct understanding of the current state and the long-term S&T development trends in different countries is an essential input into the formulation of military-technical policy and the development of the armed forces.¹⁵ This type of comparative analysis is conducted at many different levels, ranging from aggregate country-level analysis based on broad indicators of scientific and technological development to the micro level, in which countries are compared with respect to an individual technology or application. At the aggregate level, a country's technological prowess is indicative of its ability to "create and defend against military dangers

¹⁵ A. A. Kokoshin, ed., *Vliianie tekhnologicheskikh faktorov na parametry ugroz natsionaloi i mezhdunarodnoi bezopasnosti, voennykh konfliktov i strategicheskoi stabil'nosti*, Moscow: Izdatel'stvo Moskovskogo Universiteta, 2017.

Table 4.3
Robotics-Related Institutions

Year	Institution	Function
2012	Main Research and Testing Center for Robotics of the MOD	Research center conducting applied research on and development and testing of military robotic systems.
2012	Prospective Research Foundation	Research center: A 2013 report of the Prospective Research Foundation for the Military-Industrial Commission listed military robotics among their priority programs. Critical technologies assigned to this program include deep-sea autonomous robots, high-altitude UAVs, unmanned transport multicopters, robotic trucks, ground patrol robots, and an exoskeleton. ^a
2014	Main Directorate of Scientific Research and Technological Support of Advanced Technologies of the MOD	Responsible for the organization of research and development of robotic technologies.
2015	National Center for the Development of Technologies and Basic Elements of Robotics operating under the Prospective Research Foundation	Responsible for the development and production of robotic systems of military, dual and special purposes; provides an assistance to scientific, educational, and innovative organizations in the implementation of prospective research and development in the field of robotics.

^a Ilia Klabukov, Ilia Kramnik, and Vasilii Lebedev, *Fond perspektivnyh issledovaniy v sisteme oboronyh innovatsii*, Obshchestvennyi Sovet Predsedatelia Voenno-promyshlennogo kompleksa, 2013, pp. 67–83.

and threats.”¹⁶ At the micro level, the relative development of different technologies is an important input in the practical selection process of priority development areas.

In particular, the aggregate S&T development of a country is seen as an essential component of broader economic potential in which the technology is essentially represented as total factor productivity (TFP) that amplifies capital and labor—the two essential production fac-

¹⁶ Tsyrendorzhiev, 2014, p. 45.

tors in Robert Solow's growth model.¹⁷ The inputs used to calculate TFP vary across publications. For example, Tsyrendorzhiev, a senior researcher at the 46th TsNII, presented a methodology for comparative assessment of aggregate S&T development by creating a composite index from several key indicators: the number of scientists employed in R&D, gross R&D expenditure (nominal and as share of GDP), number of scientific publications in the Web of Science (a comprehensive database of academic works), number of citations (aggregate and per publication), and expenditure on information technologies as a share of GDP. The Higher School of Economics in Moscow calculates TFP by tracking patent applications and the share of enterprises that are engaged in technological innovation. Regardless of the specific components that might go into such an index, Russia's position relative to most large industrialized economies was comparatively weak in both cases.

At the micro level, the comparative evaluation of technologies is an important criterion in the selection of critical technologies and is usually a part of the "quality (effectiveness)" section of the sample survey presented in Burenok (2018b). All else being equal, the technologies that are closer to the global frontier are given a higher score and, therefore, are more likely to make it to the final list of critical technologies. A country would presumably first rely on its strengths to solve any given military-technical task rather than attempt to swiftly build technological capabilities in an area in which it is lagging behind.

In the context of the technology selection process outlined in the previous section, cross-country technology comparison takes place during the initial preparation phase of forecasting because participating experts have to receive the background materials on the development of each technology from their respective area of expertise before the formal evaluation starts.

At the same time, no authoritative Russian source has published a comprehensive cross-country ranking for each critical military tech-

¹⁷ For an accessible treatment of the role of technology in the Solow's growth model see, among others, N. Gregory Mankiw, *Macroeconomics*, 9th ed., New York: Worth Publishers, 2015, pp. 236–239.

Table 4.4
Science, Technology, and Innovation Indicators, 2017

Country	R&D Personnel (thousands)	Articles in Scientific Journals Indexed in the Web of Science	Gross Domestic Expenditure (GDE) on R&D (million\$)	GDE on R&D as a % of GDP	Government Funding as a % of GDE on R&D	Patent Applications	Enterprises Engaged in Technological Innovation as a % of All Industrial Enterprises
United States	1,380.0	428,731	511,089.0	2.74	25.1	605,571	12.8
Russia	778.2	51,012	42,270.9	1.11	66.2	36,454	7.5
Brazil	347.7	57,721	41,104.1	1.28	50.2	28,010	38.9
Canada	237.3	72,840	26,222.4	1.53	33.0	34,745	32.2
China	3,878.1	350,759	451,201.4	2.11	20.0	1,338,503	26.9
France	428.6	78,682	62,162.7	2.25	32.8	16,218	40.9
Germany	656.7	116,396	118,158.5	2.93	28.5	67,899	52.6
India	528.2	84,645	50,118.7	0.62	—	45,057	—
Italy	258.6	72,672	29,915.9	1.29	38.0	9,821	37.0
Japan	872.3	84,871	168,644.9	3.14	15.0	318,381	28.3
Republic of Korea	447.4	63,157	79,354.3	4.23	22.7	208,830	34.6
Taiwan	251.0	25,807	35,756.9	3.16	21.3	—	—
United Kingdom	419.9	129,529	47,244.5	1.69	27.7	22,059	40.9

SOURCE: Leonid Gokhberg, Yaroslav Kuzminov, Aleksey Medvedev, and Marina Sabelnikova, eds., *Science. Technology. Innovation: Pocket Data Book*, Moscow: Higher School of Economics, 2019.

nology. Therefore, we will look at several different sources of comparison and attempt to draw some lessons from this fragmentary information (Table 4.4). We will start with Russia's largest forecast exercise that identified the priority areas for (general) science and technology development.

Russia 2030: Science and Technology Forecast

To better understand how Russian scientists and policymakers assess Russia's relative position in technology development, we start by briefly examining the largest civilian technology assessment exercise conducted in recent years—Russia 2030: Science and Technology Forecast (RSTF) (see Table 4.5).¹⁸ This forecast exercise was touted as an important instrument for identifying the country's strategic directions in technology development and involved over 2,000 Russian and foreign experts from different science and technology fields and a great amount of interagency coordination.¹⁹ RSTF was completed in 2013 and the full results were published in 2016, including a detailed description of priority areas combined with a list of over 1,000 R&D priorities needed to produce certain groups of innovative products and raise Russia's development level relative to the global technological frontier.

Although Russia's comparative standing is assessed relative to the global technology frontier, the explanation for each technology usually lists the United States as the leader in most fields.²⁰ This is consistent with aggregate comparisons conducted by Tsyrendorzhiev (2015), who used the United States as a reference point to calculate the relative position of different countries.

¹⁸ Leonid Gokhberg, ed., *Russia 2030: Science and Technology Foresight*, Moscow: Higher School of Economics, 2016.

¹⁹ Gokhberg (2016) suggests that eight ministries—the Ministry of Telecom and Mass Communications, Ministry of Health, Ministry of Transport, Ministry of Finance, Ministry of Economic Development, Ministry of Industry and Trade, Ministry of Natural Resources and Environment, and the Ministry of Energy—and two quasi-ministerial bodies: the Russian Federal Space Agency and the Russian Academy of Sciences, were involved in this study.

²⁰ The United States is explicitly mentioned as a leader in terms of most technologies, sometimes alongside Japan and individual European countries or the EU as a whole.

Table 4.5
Selected Results from Russia 2030: Science and Technology Forecast

Technology	Level of Russian Research ^a				
	1	2	3	4	5
Telecommunication technologies					
Exaflop supercomputers		X			
Computational algorithms and software for supercomputers		X			
Distributed systems and architectures		X			
New server and PC architectures		X			
New data transfer technologies			X		
Novel network organization technologies			X		
Digital reality technologies, human-ICT interfaces			X		
Technologies for collecting, processing, analyzing, and storing big data		X			
New multimedia data-processing technologies	X				
New technologies for processing text-based and poorly structured data		X			
Prospective web-based technologies and systems		X			
Technologies for automated element base design		X			
Robotics		X			
Modeling complex systems and processes		X			
Intelligent management and decision support		X			
Reliable identification and authentication in ICT		X			
Meeting new challenges of the information war and cybercrime in ICT		X			
Cognitive technologies		X			
New materials and nanotechnologies					
High-strength materials			X		
Durable materials		X			

Table 4.5—Continued

Technology	Level of Russian Research ^a				
	1	2	3	4	5
Heat-resistant materials		X			
Radiation-resistant materials			X		
Sensory materials					
Transport and space systems					
Prospective launch vehicles				X	
Wireless energy transfer for transportation vehicles and spacecraft		X			
Prospective materials for extreme conditions of space flight, high-speed movement in land-based and water environments		X			

SOURCE: Gokhberg, 2016.

NOTES: ICT = information and communications technology.

^a 1 = Russia has significant lag behind global levels, lack of scientific schools; 2 = basic knowledge, skills, and infrastructure; 3 = limited number of competitive teams carrying out research at a high level; 4 = parity, Russian research just as strong as global research; 5 = Russian researchers are global leaders.

A 2017 study led by Andrei Kokoshin, the former Secretary of the Russian Security Council, identified several U.S. capability developments that Kokoshin and coauthors contend could disrupt strategic stability over the next decade (see Table 5.2 for a summary of selected U.S. technological developments highlighted in the study). In their view, the continued improvement and expansion of missile defense technology cannot be intended only to mitigate potential threats from Iran and North Korea, but rather is intended to achieve “military superiority over [America’s] primary competitors on the world stage—Russia and China.”²¹ A common Russian point of contention that is also found in the study is the deployment of a “global missile defense system” that exists as part of a larger collection of offensive and defensive capabilities.²² As the authors wrote,

²¹ Kokoshin, 2017, p. 158.

²² Kokoshin, 2017, p. 158.

A number of [Russian] and foreign experts suggest that the American missile defense system, even over the long term, will not be able to somehow significantly devalue Russia's nuclear deterrence potential. However, this claim is not correct. The capabilities of the United States' global missile defense system should not be considered individually, but rather together with the potential of American strategic offensive forces, including the current nuclear triad and nonnuclear long-range precision weapons . . . that in the near future will become more effective" based on modernization plans.²³

Cross-Country Comparison in Select Military Technologies

Because the actual list of critical military technologies is not public, there are no comprehensive analyses on how Russia compares with other countries in terms of each technology. At the same time, several authoritative sources have discussed Russia's relative standing in terms of certain military technologies.

The Public Council of Russia's Military Industrial Commission published a report on the role of the Prospective Research Foundation (*Fond perspektivnykh issledovaniï*) in the military innovation system.²⁴ In that report, published in 2013, the authors grouped several of the most important military technologies in three groups: high competence, partial competence, and insufficient (partially lost) competence. For the technologies listed in the first group, the authors found that Russia had mastered all of the underlying technologies and can independently further develop the technology without a significant reliance on imports. For the technologies in the second group, Russia did not possess the full capacity necessary for independent development or production of the technology or main component parts and had to rely on importing foreign technology. This was primarily the case when key R&D institutions were located outside Russia after the collapse of the Soviet Union (primarily in Ukraine) or in technology areas that were traditionally undeveloped or have decayed over time. Finally, the third

²³ Kokoshin, 2017, p. 159.

²⁴ Klabukov, Kramnik, and Lebedev, 2013.

Table 4.6
Selected U.S. Military-Technological Trends with Implications for Strategic Stability

System	Domain	Year Expected
Space-based infrared system	Missile defense	2020
Aegis with SM-3 Block IIA	Missile defense	2020
Airborne laser program	Missile defense	Unknown
Directed energy, electronic warfare, super high frequency, cyber weapons	Space (anti-optoelectronics, anti-satellite)	Concept
XS-1 spaceplane	Space	Concept
Robotic servicing of geosynchronous satellites	Space	Concept
Low-yield tactical nuclear weapons (i.e., B61-12)	Air, land, sea	2020+
Hypersonic technologies	Air, land, sea	2020–2024

SOURCE: Kokoshin, 2017.

group of technologies referred to those areas in which Russia either never had significant competence or those areas in which the past competences were completely lost. Table 4.6 lists the main technologies in each group.

Several important changes happened since this analysis was published in 2013. For instance, Russia not only developed powerful hypersonic weapons but is currently claiming global leadership in that technology.²⁵ In addition, Russia has built its first prototype of stealth heavy UAV, thus arguably moving the technology from insufficient

²⁵ Ilya Legam, “Rossiya - lider v oblasti razrabotki giperzvukovogo oruzhiya. Pravda?” *Voennoe obozrenie*, January 24, 2020.

competence to partial competence.²⁶ At the same time, the report does not provide details on the evaluation methodology.

According to the most recent literature, it appears that cross-country technology assessments still heavily rely on qualitative methods used to elicit expert opinion. Byvshish, Zelenskaya, and Yarygin (2019) discussed the methodology for the comparative analysis of domestic and foreign military radioelectronic technologies and proposed a more formalized methodology to aggregate the results of expert evaluation. Their methodology is also based on social scientist Thomas Saaty's analytic hierarchy process (AHP), similar to Burenok (2009). In a useful addition to prior literature, the authors provided a list with relative weights of different evaluation criteria. Unsurprisingly, the combat effectiveness criterion has the highest weight in the final index, followed by the possibility of R&D breakthrough, R&D feasibility, technological feasibility, the possibility of use in different weapon systems, and novelty. The final output of this analysis is presented in the form of two graphics (Figures 4.1 and 4.2).

Notably, many recent studies focusing on substantive findings of comparative analysis of military technologies often lack a methodology section, while studies focusing on comparative assessment and forecasting methodologies may be short on real-world analysis and substantive discussion of outcomes. For example, Burenok and Gladyshevski (2015) discuss the development path of computer science and technology in military applications and summarize their analysis of the main directions of research and the relative position of Russia in a comparative chart (Figure 4.5). At the same time, the authors avoid discussing the methodology behind the relative ranking and merely state that the results are based on "analysis of domestic and foreign scientific publications" and "prolongation of certain current trends."²⁷ Conversely, Byvshih, Zelenskaya, and Yarygin (2019) provide a detailed discussion of a proposed methodology for comparative assessment of domestic and foreign technologies for radioelectronic warfare while sidestepping the substantive discussion of the results. In fact, the results of this study

²⁶ "Tyazhelii bespilotnik 'Oxhotnik' sovershil pervii polet," TASS, August 3, 2019.

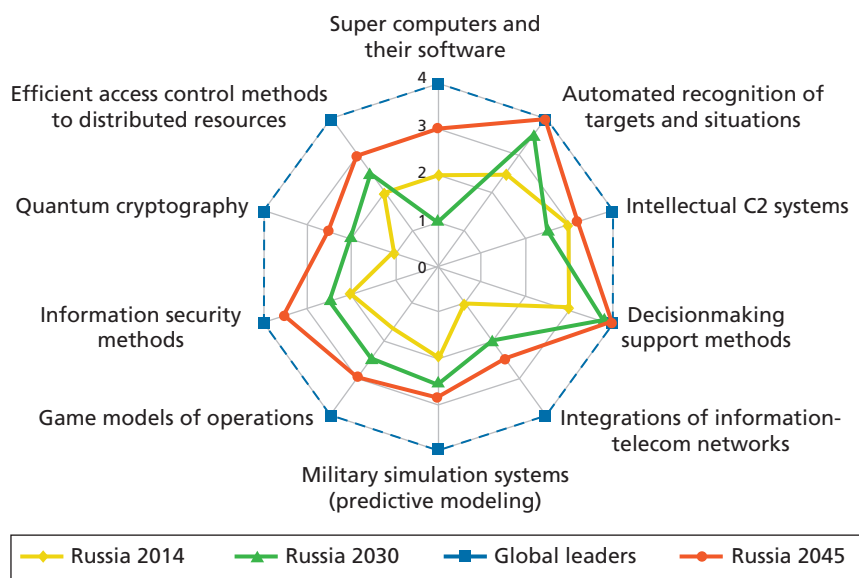
²⁷ Burenok and Gladyshevski, 2015, pp. 17–18.

Table 4.7
List of Military Technologies by Level of Competence

High Competence	Partial Competence	Insufficient Competence
Combat aviation	Helicopters and equipment	Electronic component base
Missile equipment and technologies	Production of helicopter engines	Optical systems
Production of engines for combat aircraft	Military transport aircraft	Turboprop engines for light class helicopters and light aircraft
Noncarrier combat surface ships	Commercial aircraft	Composite materials
Submarines	Motor vehicles	Heavy class UAV
Medium and heavy armored combat vehicles	Light armored combat vehicles	Strike UAV
Air defense and missile defense systems of all ranges	Production of modern diesel engines of small and medium power, gearboxes	
	Communications and command and control equipment for the ground forces	
	Light and middle class unmanned aerial vehicles	
	Unmanned underwater vehicles, ground robots, engines and equipment for them	
	Small arms, infantry equipment, personal protective equipment	
	Modern ground artillery systems	
	Aircraft-carrying ships, control ships, universal landing ships	
	Nonvolatile power plants for nonnuclear submarines	
	Spacecraft	

SOURCE: Summarized from Klabukov, Kramnik, and Lebedev, 2013.

Figure 4.1
List of the Most Important Military Information Technologies by Level of Competence



SOURCE: V. M. Burenok and V. L. Gladyshevskii, "Informatika i vychislitel'naya tehnika: perspektivy razvitiya i primeneniya v voennom dele," *Vooruzhenie i ekonomika*, Vol. 3, No. 32, 2015. Adapted from image courtesy of East View Information Services.

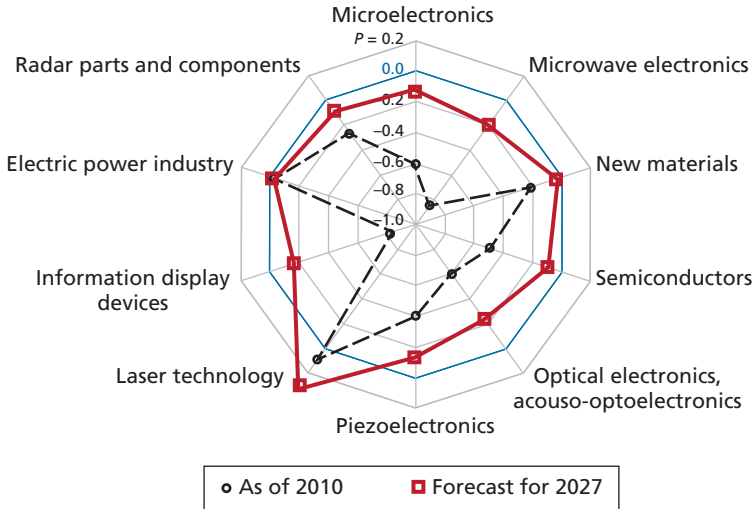
(Figure 4.2) are presented merely as a "hypothetical example of comparative analysis . . . of domestic and foreign technologies" that appears to use the analysis of only five domestic and foreign publications.²⁸

Findings and Discussion

The role of technological innovation in general and military technology innovation in particular grew considerably in the eyes of Russian leadership during the past decade or so. Two main factors that motivate innovation are the continued dependency of the Russian econ-

²⁸ Byvshih, Zelenskaya, and Yarygin, 2019, pp. 105, 107.

Figure 4.2
List of the Most Important Military Radioelectronic Technologies by Level of Competence



SOURCE: D. M. Byvshih, S. G. Zelenskaya, and Yu. N. Yarygin, "Metodika sravnitel'nogo analiza otechestvennyh i zarubezhnyh tehnologii sozdaniya radioelektronnoi tehniki voennogo naznacheniya," *Vooruzhenie i ekonomika*, Vol. 3, No. 49, 2019. Adapted from image courtesy of East View Information Services.

omy on raw materials exports and the persistent threat posed by the United States and its allies, particularly if Russia falls too far behind with respect to scientific-technical and other critical areas of military potential. Therefore, the United States' technological capabilities are often taken as reference points when measuring the advancement of military technologies. In 2015, Pankov framed his advocacy for innovative research supported by the MOD in terms of providing countermeasures to U.S. military and technological superiority.²⁹ Russia sees itself as a great power, but although it may wish to have symmetric capabilities with the United States, it has to prioritize pockets of excellence because of resource constraints.

²⁹ Pankov, 2015, p. 412.

At a general level, Russian military scholars discuss the problem of critical technologies selection in a way that is similar to that of their Western counterparts—as a general optimization problem, namely making the best use of scarce resources. In this context, the objective function is the ability to execute a set of different military (and civilian) tasks, ensured by different technologies. In the case of weapon system planning, the goal of optimization can be expressed as either minimizing costs while preserving a given level of operational capabilities or maximizing operational capabilities within a given budget. At the same time, there are several constraints that limit the amount of resources that can be invested in the development of new technologies.

The desired outcomes increased in the recent years and now include not only the ability to achieve territorial defense but also to have power projection capabilities (as in Syria), achieve self-sufficiency across a broad range of military and civilian technologies, increase the exports of advanced weapon systems, and make the military-industrial complex an engine of economic growth by mandating defense enterprises to produce a larger share of civilian products.³⁰ At the same time, many of the previous constraints—such as low productivity of R&D, limited budgets, and a weak civilian innovation system—were made worse by economic and technology sanctions and the loss of certain industrial capabilities in Ukraine. In this context, the process of selecting promising new technologies to develop pockets of excellence under tight budgetary constraints becomes more important.

At the same time, to optimally allocate scarce resources to the most important priorities, one must correctly identify the parameters of the priorities in question. This is where the quality of evaluation, forecasting, and assessment methodologies may play an important role. An earlier study of Russia's civilian technological priority documents and their underlying methodologies concluded that “a large number of

³⁰ “[GPV 2027] Aerospace Forces (VKS) will probably concentrate on filling existing gaps in procurement (especially with regard to transport aircraft), as well as on boosting power-projection capabilities and force mobility” (Richard Connolly and Mathieu Boulègue, *Russia's New State Armament Programme: Implications for the Russian Armed Forces and Military Capabilities to 2027*, London: Chatham House, Royal Institute of International Affairs, May 2018, p. 2).

[technological] priorities listed in these documents create risk for inefficient spending of government funds due to . . . unfounded evaluation of competitiveness of the Russian technological base.”³¹ In particular, the authors of that study noted that the use of forecasting methodology as the only methodological instrument of predicting the evolution of future technologies creates risks for the whole process of setting the technology priorities in Russia because of over-reliance on subjective expert opinion and a lack of formal quantitative analysis. The authors also noted that there was relatively little information on the details of the forecasting methodology used for determining the Lists of Basic and Critical Technologies between 1996 and 2009 because the official documents refer to the selection process as “based on complex scientific research with inputs from leading scientists, experts, and industry representatives with inter-departmental coordination,” without specifying any formalized rules or methodologies for technology selection and updating.³²

Furthermore, we found that experts involved in the selection process are most likely involved in research and development of these technologies, and they rely on government programs and budgets to fund their research. Consequently, they have a strong incentive to propose and lobby for technologies that are already in their development pipeline. The specifics of who exactly is invited to the proposals and assessment phase is one of the less transparent parts of the process. There is no doubt, however, that relative importance of different bureaucratic actors that are fighting over scarce resources may have an important role in the technology selection process.

Today, the process for selecting military critical technologies seems to be more formalized. However, the methods of selection are still mostly based on expert opinions and therefore remain subjective. The literature reviewed for this chapter suggests that these methods are heavily influenced by Western methods literature.

³¹ N. G. Kurakova, V. G. Zinov, L. A. Tsvetkova, O. A. Eremchenko, and V. S. Golomysov, *Aktualizatsiya prioritetov nauchno-tehnologicheskogo razvitiya Rossii: problemy i resheniya*, Moscow: Izdatel'skii dom Delo, 2014, pp. 10–11.

³² Kurakova et al., 2014, p. 22.

An integral part of this selection process is a cross-country comparison—the level of development of each proposed technology in Russia is compared with other countries that are global technology leaders. The purpose of this exercise is to understand the level of threat by a potential adversary and as an input into the technology development agenda. Currently, the comparison seems to be solely based on expert opinions; however, there are proposals to introduce more-formal mathematical methods into this process.³³ The overall assessment of Russia's technological development—both in scientific literature and in government programs—appears to suggest that Russia is lagging in terms of progress for the majority of civilian and general-purpose critical technologies, but is still preserving pockets of excellence in several important technologies.

The List of Basic and Critical Technologies contains technologies in different stages of development (from mature to prospective) and the budget allocation process appears to prioritize the development and prototyping of low-risk technologies and applied research relative to basic research—these are the characteristics of technologies developed under the SAP, which is arguably the main source of long-term government funding. Specific technologies that Russian military experts assess could be decisive in the future include robotic technologies, AI, hypersonic weapons, laser technology, and precision munitions.

³³ S. I. Bezdenezhnykh and S. G. Braytkrayts, "Informatsionnyy podkhod k otsenke slozhnosti i potentsiala razvitiya tekhnologii," *Vooruzhenie i ekonomika*, Vol. 4, No. 46, 2018.

Russian Characterizations of the VPO and Military Threats

Introduction

The previous chapters described the commonalities across methodologies to evaluate the current and future VPO and recent forecasts that have been conducted across the military science and expert community that are related to military-political, military-economic, military, and scientific-technical potentials of Russia, relative to other highly ranked countries. From the standpoint of power correlation, the forecasts that we reviewed expect Russia to trail the United States and China through 2040 regardless of the scenario that unfolds, although some scenarios are more favorable for Russia than others. But an unfavorable power dynamic alone does not necessarily translate into a direct threat or increased probability of war. Official Russian assessments have uniformly found that the probability of large-scale war involving Russia is low, despite the fact that military threats exist. The severity of a military threat is likewise determined by a confluence of factors, such as the hostile intentions on the part of an aggressor and a negative power correlation for Russia. In this chapter, we summarize recent Russian characterizations of the VPO and the military threats and *dangers* (less acute than *threats*) to gain a sense of the Russian perspective on the potential alignment of critical negative factors—hostile intentions and unfavorable correlations of military potential—for Russian military security.

Russian Characterizations of the VPO

The official assessments of the leading geopolitical trends and the VPO—which inform strategic planning—are found in Russia’s strategic conceptual documents related to defense and security: the Military Doctrine, the National Security Strategy, the Foreign Policy Concept and the Science and Technology Development Strategy. The content of introductory and subsequent language of these documents over time can provide insight into how the official VPO assessment itself is evolving. For example, the introductory section of the 2000 Russian Military Doctrine, which was called “The Military-Political Situation,” noted the growing prevalence of noncontact warfare as having had significant influence on the VPO, which remains true as of 2020:

The condition and prospects for the development of the modern [VPO] are determined by the qualitative improvement of the means, forms, and methods of warfare, the increase in its spatial scope and severity of the consequences of war, and the expansion [of warfare] to new domains. The possibility of achieving military-political objectives with indirect, noncontact actions predetermines the particular danger of modern wars and armed conflicts to peoples and states and to the preservation of international stability and peace, and necessitates the vital need to take exhaustive measures to prevent [conflicts], and to peacefully resolve contradictions in their early stages.¹

Other factors influencing the condition of the VPO in 2000 included a decrease in the danger of large-scale war, including nuclear war; the formation of regional power centers; the “activation” of separatism; and the proliferation of local wars and armed conflicts, among others. Actions destabilizing the VPO at that time were attempts to weaken international stability mechanisms, such as the United Nations, and the use of information and other “technologies” for aggressive and expansionary purposes. In other words, the VPO at that time seemed mostly to be determined by Russia’s perception of U.S. actions.

¹ President of Russia, *Military Doctrine of the Russian Federation*, April 21, 2000.

The most recent Russian Military Doctrine, published in late 2014, noted that the international environment was experiencing an increase in global competition based on rivalry between development models and the ongoing redistribution of influence to new power centers; these are not significant departures from what was stated in 2000. Similarly, the probability of the outbreak of large-scale war involving Russia remained low.² The National Security Strategy (2015) and Foreign Policy Concept (2016) offered similar assessments at the time of their respective publications. For its part, the S&T Development Strategy (2016) found several deficiencies in Russia's technology sector that were "creating risks of Russia falling behind technology leaders [...] reducing the independence and competitiveness of Russia in the world and putting national security at risk."³ On the other hand, while the use of information as a weapon was briefly mentioned in the 2000 Military Doctrine, the increased attention to the subject in the 2014 Military Doctrine was illustrative of the Russian perception of increased threat in this area.⁴

Senior Russian military leaders, such as the Chief of the General Staff, his deputies, and the commanders of the military districts, also discuss the condition of the VPO in speeches and articles. Their views are an important indicator of the most significant actions shaping the VPO as seen from Russia. In his 1999 article, Viktor Baryn'kin's forecast involved the struggle among states for an increasingly limited supply of natural resources. As a country in possession of a large amount of such resources, Russia would inevitably be "pulled into the orbit of global interests of the leading states of the world," which could result in military conflict as the aggressor sought to secure its interests. This same theme involving the struggle for resources has been repeated

² In their 2017 forecast to 2035, scholars from IMEMO observed that nuclear deterrence measures were likely to preclude a great power military conflict over the forecasted period. See Dynkin, 2017, p. 238.

³ President of Russia, "Ukaz Prezidenta Rossiiskoi Federatsii ot 1.12.2016, No. 642: O strategii nauchno-tekhnologicheskogo razvitiia Rossiiskoi Federatsii," December 1, 2016.

⁴ Based on analysis of the texts of the 2000, 2010, and 2014 Russian Military Doctrines.

in 2014 and 2015 speeches by senior Russian officers summarizing the VPO (see below).⁵

In 2004, the then–Chief of the General Staff, Yurii Baluevskii, addressed the “Military-Political Situation, Problems in National and International (Regional) Security.”⁶ Baluevskii described Russia’s vital interests and the key threats to those interests, and offered solutions to mitigate such threats. Baluevskii explained that over an unspecified time horizon, border issues—including Chinese territorial claims—and associated conflicts in the former Soviet space increased the possibility that this territory could “turn into an area where military force will play a significant role in politics. This is particularly true of low-intensity conflicts that may tend to escalate, leading to an increased risk of local wars for Russia.”⁷ In 2006, Baluevskii stated that for force structure planning up to 2015, the “military-political assessment” should be that there is minimal danger of the outbreak of large-scale war against Russia.⁸ The focus on the increased probability of local conflicts along Russia’s periphery has not abated over time, although any official public discussion of a Chinese threat has virtually

⁵ For additional Russian discussion of this topic, see, Aleksandr Sharavin, “Tret’ia ugroza. Voennoe stroitel’stvo Rossii vedetsia bez ucheta opasnosti, iskhodiashchei s Vostoka,” *Nezavisimoe Voennoe Obozrenie*, No. 36, September 28, 2001; R. P. Koshkin, “Analiz mezhdunarodnoi obstanovki, osnovnye vyzovy i ugrozy bezopasnosti Rossii (po itogam kvartala 2019 goda),” *Voenno-Strategicheskii Analiz*, No. 1, 2019; B. B. Korabel’nikov, “Osobennosti geopoliticheskoi obstanovki v mire, voennye ugrozy Rossii,” *Voenno-Strategicheskii Analiz*, No. 1, 2019; and V. P. Malyshev and E. Ia. Bogatyrev, “Analiz voennykh ugroz natsionalnoy bezopasnosti Rossii i ikh vliyanie na planirovaniie meropriiatiit grazhdanskoi oborony,” *Strategiia grazhdanskoi zashchity: problem i issledovania*, Vol. 2, No. 7, 2014.

⁶ Yurii Baluevskii, ed., *Voennaia bezopasnost’ Rossiiskoi Federatsii v XXI veke, Tsentral’no-voennostategicheskikh issledovaniy General’nogo shtaba*, Moscow, 2004, pp. 10–25.

⁷ Baluevskii, 2004, p. 18.

⁸ Yurii Baluevskii, “O stroitel’stve Vooruzhennykh sil Rossiiskoi Federatsii,” *Vestnik Akademii voennykh nauk*, Vol. 1, No. 14, 2006, p. 20.

disappeared.⁹ As we explained in a previous report, these assessments and forecasts were highly consequential to the future development of Russian force structure, which was reformed not to wage large-scale attrition warfare, but to respond quickly to crises along Russia's periphery and to deter NATO through long-range strike capabilities and strategic nuclear weapons.¹⁰

The tenure of the current Chief of the General Staff, Valerii Gerasimov, has been characterized by some continuity as well as divergence with the past. A consistent theme has continued to be that the actions of the United States are negatively affecting the VPO. In 2018, he argued that the “desire of the United States to not allow the loss of its ‘global leadership’ and to preserve the unipolar world by any means [necessary] . . . is having a decisive influence on the development of the military-political situation.”¹¹ A notable shift in emphasis under Gerasimov has been increased emphasis on the fact that the tools employed in the intensifying geopolitical struggle have shifted—to some extent—toward the nonmilitary realm of state confrontation, although the importance of hard power remains. Gerasimov's views, can be briefly summarized as follows.¹²

⁹ See speeches of N. E. Makarov to the Academy of Military Sciences from 2009–2012, published annually in the *Vestnik Akademii voennykh nauk*: N. E. Makarov, “Vystuplenie nachal'nika General'nogo shtabe Vooruzhennykh Sil Rossiiskoi Federatsii – pervogo zameshitelia ministra oborony Rossiiskoi Federatsii generala armii N. E. Makarova,” *Vestnik Akademii voennykh nauk*, Vol. 2, No. 39, 2012; “Vazhneishaia zadacha voennoi nauki – razrabotka kontseptsii netraditsionnykh voyn i vooruzhennykh konfliktov,” *Vestnik Akademii voennykh nauk*, Vol. 2, No. 35, 2011, pp. 15–18; N. E. Makarov, “Kharakter vooruzhennoi bor'by budushchego, aktual'nye problem stroitel'stva i boevogo primeneniia vooruzhennykh sil RF v sovremennykh usloviakh,” *Vestnik Akademii voennykh nauk*, Vol. 2, No. 31, 2010, pp. 18–26; and N. E. Makarov, “Tezisy vystupleniia nachal'nika General'nogo shtabe Vooruzhennykh Sil Rossiiskoi Federatsii generala armii N. E. Makarova,” *Vestnik Akademii voennykh nauk*, Vol. 1, No. 26, 2009, pp. 19–23.

¹⁰ Reach, Kilambi, and Cozad, 2020.

¹¹ Gerasimov, 2018, p. 17.

¹² See speeches of V. V. Gerasimov to the Academy of Military Sciences from 2013–2019, published annually in the *Vestnik Akademii voennykh nauk*. For example, V. V. Gerasimov, “Vliianie sovremennogo kharaktera vooruzhennoi bor'by na napravlennost' stroitel'stva i razvitiia vooruzhennykh sil Rossiiskoi Federatsii. Prioritetnye zadachi nauki v obespechenii oborony strany,” *Vestnik Akademii voennykh nauk*, Vol. 2, No. 63, 2018.

Key features of modern warfare include the application of economic and diplomatic pressure against so-called rogue countries and external activation of the “protest potential” of a population to unseat a ruling regime considered unfriendly to the West from within. If such efforts are unsuccessful, they could be followed by military action, most likely taking the form of a large aerospace attack with precision-guided munitions to “reduce the military-economic potential of a state by destroying its critically important military and civilian infrastructure.”¹³ Russian officers and military science experts have, in broad consensus, noted this “new type” of warfare in the former Yugoslavia, Iraq, Libya, Syria, Ukraine, and Venezuela, and have suggested that the development of the means to respond to this approach to warfare is largely driven by this interpretation of U.S. behavior and capabilities.¹⁴

Gerasimov’s comments from several speeches, in addition to the aforementioned 2014 Military Doctrine and remarks by other senior Russian officials, indicated that the probability of internal conflict within Russia instigated from the outside was increasing and that the probability of large-scale war remained low. Even prior to the conflict with Ukraine, which Russia believes was fomented by the United States, Russia was paying close attention to the unrest taking place across North Africa and the Middle East, in which “political, economic, information, humanitarian, and other nonmilitary measures are combined with the protest potential of a country” to upend the political order of a country.¹⁵

¹³ Gerasimov, 2014, p. 15. Gerasimov repeated this sequence of events in 2019 (V. V. Gerasimov, “Vektory razvitiia voennoi strategii,” *Krasnaia zvezda*, March 4, 2019).

¹⁴ See, for example, Popov and Khamzatov, 2018, pp. 241–245; and Andrei Kartapolov, “Uroki voennykh konfliktov, perspektivy razvitiia sredstv i sposobov ikh vedeniia. Priamyie i nepriamyie deistvii v sovremennykh mezhdunarodnykh konfliktakh,” *Vestnik Akademii voennykh nauk*, Vol. 2, No. 51, 2015.

¹⁵ V. V. Gerasimov, “Osnovnye tendentsii razvitiia form i sposobov primeneniia vooruzhennykh sil, aktual’nye zadachi voennoi nauki ikh sovershenstvovaniuu,” *Vestnik Akademii voennykh nauk*, Vol. 1, No. 42, 2013, p. 24. This uses a side-by-side comparison of the two documents.

One way Russia has responded to changes in warfare was the creation of the National Guard under the command of Putin's former bodyguard, Viktor Zolotov, a move that parallels with the formation by Tsar Alexander I of the *vnutrenniaia strazha* (internal guards) under Count Evgraf Komarovskiy.¹⁶ The new organization consolidated separate internal security forces from the Ministry of Internal Affairs and other organizations. According to Zolotov, the conditions that required standing up the National Guard included the "expansion of the scale of geopolitical confrontation tied to the desire of the West under the leadership of the United States to global domination and the deterioration of the foreign political situation that followed the coup d'état, the so-called Euromaidan, in Ukraine in 2014."¹⁷ Others have suggested that the large protests that took place in Russia in 2011 and 2012 in response to alleged election fraud and the announcement of the return of Putin to the presidency, respectively, may have served as catalysts for reform of the internal security forces.¹⁸ Although the primary role of the National Guard—to maintain domestic stability and prevent the outbreak of a "color revolution" in Russia—seems to be clear, its coordination with the Russian armed forces is less so, and the improvement of this coordination has been an ongoing line of effort to respond to a period of direct threat, according to Gerasimov.¹⁹

Military District Commanders and the VPO

General-Colonel Sergei Surovikin, who at the time was the Commander of the Eastern Military District and currently is the Chief

¹⁶ Dominic Lieven, *Russia Against Napoleon: The True Story of the Campaigns of War and Peace*, New York: Viking Penguin, 2011.

¹⁷ Viktor Zolotov, "Ot vnutrennei strazhi k voiskam National'noi gvardii: razvitie Sistemy upravleniia voenno-pravookhranitel'nykh formirovaniia v Rossii," *Akademicheskii vestnik voisk natsional'noi gvardii*, Vol. 2, 2016, p. 18.

¹⁸ Zdzislaw Sliwa, *The Russian National Guard: A Warning or a Message?* Riga, Latvia: Centre for Security and Strategic Research, National Defense Academy of Latvia, Working Paper No. 01/18, 2018, p. 7.

¹⁹ V. V. Gerasimov, "Organizatsiia oborony Rossiiskoi Federatsii v usloviakh premeneniia protivnikom 'traditsionnykh' i 'gibridnykh' metodov vedeniia voiny," *Vestnik Akademii voennykh nauk*, Vol. 2, No. 55, 2016, p. 22.

of the Aerospace Forces, stated in 2014, “In the modern world, the military-political situation is shaped by the intensification of a competitive struggle between the world’s leading powers and military-political coalitions of states for the expansion of spheres of influence, control over economic centers, and ensuring guaranteed access to areas with rich natural resources”; these areas included the Arctic and the Asia-Pacific region.²⁰ A year later, the Chief of the Main Operations Directorate (and subsequently Commander of the Western Military District) Andrei Kartapolov also touched on the theme of growing competition for limited natural resources and the increased threat of color revolutions to Russia.²¹ IMEMO’s 2035 forecast came to the opposite conclusion, noting that the struggle for natural resources was not likely to lead to war among leading states in the forecast period. Using language similar to that of the 2014 Military Doctrine, General-Colonel Aleksandr Galkin, the former commander of the Southern Military District, noted in 2016 that

[a]n analysis of the development of the military-political situation and the existing threats to the Russian Federation allows one to assert that the outbreak of a large-scale war is unlikely. At the same time, the possibility for a direct clash with certain states—whose force structure foundations are built in the “mold” of the North Atlantic alliance—remains. A scenario in which several local armed conflicts artificially and simultaneously break out on the borders of the Russian Federation cannot be ruled out.²²

An *armed conflict*, as referred to by Galkin, is defined by the 2014 Russian Military Doctrine as “an armed clash of a limited scale

²⁰ Sergei Surovikin, “Formy primeneniia i organizatsiia upravleniia mezhvidovoi gruppirovki voisk (sil) na teatre voennykh deistvii,” *Vestnik Akademii voennykh nauk*, Vol. 1, No. 46, 2014, p. 40.

²¹ Kartapolov, 2015.

²² Aleksandr Galkin, “Formy boevogo primeneniia i organizatsiia upravleniia integrirovannyimi gruppirovkami Vooruzhennykh sil na teatre voennykh deistvii,” *Vestnik Akademii voennykh nauk*, Vol. 2, No. 55, 2016, p. 53.

between states (international armed conflict) or between opposing sides in the territory of one state.”²³ The next level of military conflict is a *local war*, which is defined as “a war pursuing limited military-political objectives when military actions take place within the borders of the warring states and affecting mainly the interests (territorial, economic, political, etc.) of these states.” What Galkin may have had in mind were simultaneous armed conflicts occurring in Ukraine and Georgia, and Russia intervening in both. If other states were to become involved, Russia would classify this as either a regional or *large-scale war*, the latter of which would require the “mobilization of all physical resources available and spiritual strength of the participating states.” The role of Russia’s general purpose forces in a scenario along these lines would be to ensure that the local war remained isolated and external actors were deterred from intervening, thus avoiding escalation to wider conflict that could involve some degree of mobilization. As a leading Russian military scientist explained in a more theoretical discussion:

When assessing the military-political situation, one should first include only indicators of the combat capabilities of the Armed Forces: the combat potentials of troop groupings deployed in a given region, starting with constant readiness formations and units. If it is impossible to counter the military threat with these forces, it is necessary to take into account the combat potentials of the armed forces in their partial and full mobilization deployment and, finally, the full military power of the state.²⁴

Military-Political Officer Training and the VPO

The first course in the “[2020] Academic Plan for the Military-Political Training of Officers of Brigades/Regiments and other Organizations of the Armed Forces of the Russian Federation” was titled “Russia in the Modern World. The Primary Trends in Social-Economic, Politi-

²³ President of Russia, 2014b.

²⁴ Tsyrendorzhiev, 2014, p. 35.

cal, and Military-Technical Development of the Country.”²⁵ The first half of the course lecture, offered by Aleksandr Perendzhiev, a professor at the Plekhanov Russian Economic University, identified threats to the development of Russia, which centered on a qualitative innovation race between Russia and the United States, and to some extent China, Great Britain, France, and other nuclear powers, in the area of military technology. Perendzhiev highlighted the development of a low-yield nuclear weapon and a tailored output nuclear weapon (*iadernaia boegolovka s upravliaemyi porazhaiushchimi faktorami iadernogo vzryva*).²⁶ Another Russian assessment from 2017 considered the implications of low-yield nuclear weapon development: “one can expect that plans for the modernization of tactical nuclear weapons in Europe through rearmament with the B61-12 will lead to a lowering of the threshold for employing nuclear weapons.”²⁷ Other trends identified by Perendzhiev included the growing quantitative and spatial scale of NATO exercises of up to 40,000 soldiers operating from Iceland to Finland and the Baltic Sea. Bulwarks against Western activities were Russian diplomatic efforts at relationship-building within the Eurasian Economic Union, BRICS, the Shanghai Cooperation Organization, APEC, and the Group of 20; increased military cooperation with China; and the “recognition of the acute need to increase the defense of traditional values of Russian society and for spiritual unity in the complex conditions of global instability.”²⁸

Mobilization and the Low Probability of Large-Scale War

One of the curiosities of persistent Russian claims that the likelihood of large-scale war is low is the simultaneous emphasis on military and state mobilization under the leadership of Shoigu and Gerasimov. As

²⁵ A. Perendzhiev, “Tema PO VPP N1 dlia ofitserov,” *Armeiskii sbornik*, Vol. 11, November 2019.

²⁶ Perendzhiev, 2019, p. 89. For a brief discussion of “tailored output weapons,” see Stephen M. Younger, *Nuclear Weapons in the Twenty-First Century*, Los Alamos National Laboratory, Federation of American Scientists, LAUR-00-2850, June 27, 2000.

²⁷ Kokoshin, 2017, pp. 205–206.

²⁸ Perendzhiev, 2019, pp. 91–92.

we noted in Chapter One, the 2013 decree signed by Putin expanded the authorities of the General Staff to assert greater control over mobilization training activities of the Russia's military organization. If there is little chance of a big war, then why would Russia (and Belarus) be focusing on building up territorial defense forces and ensuring that senior civilian leaders were fulfilling their responsibilities to be prepared to execute mobilization measures across the country?²⁹

The time period leading up to the decree and the timing of its entrance into force offer some insight. In many respects, the 2008 military reforms dismantled what remained of the Soviet-based mobilization system. Because Russian military leadership believed at that time that modern wars did not allow for prolonged periods of mobilization, the priority was on high readiness in Russia's general purpose and deterrence forces to manage and respond to military threats. As a result, the mobilization system was not prioritized by the General Staff and Ministry of Defense.³⁰ Events in Libya in 2011 may have played some role in the increased attention to state mobilization: Putin, for the second time in eight years, witnessed the death of a head of state (Muammar al-Gaddafi) following external military intervention. The case of Libya followed a pattern perceived by Russia as one beginning with large-scale street protests supported by military force from abroad and resulting in regime change. According to Gerasimov, this "way of warfare" required the General Staff to ensure that the country in question could respond to a chain of events within the country resembling what Russia had observed elsewhere.³¹

The evolution of Russian planning in this area is also evidenced by the creation of a strategic reserve that is paid and trains more regularly, and the formation of territorial defense units to protect critical

²⁹ Vladimir Iatsenko, "Strana bez territorial'noi oborony," *Voenno-promyshlennyyi kur'er*, April 30, 2013; Gerasimov, 2015, p. 14; and Vladimir Ostankov, "Voiny budushchego nachinaitsia segodnia," *Voenno-promyshlennyyi kur'er*, October 15, 2019.

³⁰ Vladimir Ostankov, "Strategicheskikh rezervov net," *Voenno-promyshlennyyi kur'er*, March 17, 2014.

³¹ Gerasimov, 2014; see also V. L. Dorokhov, A. I. Petrushin, and G. A. Nikonorov, "O sovershenstvovanii territorial'noi oborony s uchetom osobennostei gibridnykh voyn," *Voennaia mysl'*, No. 12, 2019.

infrastructure from sabotage. Although the former effort is reportedly stagnating because of resource constraints, the intention to create these entities is indicative of concern about widespread insecurity across Russia, resulting either from domestic discontent or from a large-scale conflict. To be sure, a country like Russia—large territory, history of foreign invasion, and inflexible political system—is going to seek to be prepared for a wide variety of crises of varying probabilities. In the case of mobilization, the long-term trend lines suggest that at some point in the future, Russia will be able to draw greater numbers of ready reserves and be able to mount an organized defense of the homeland, regardless of the domestic or foreign origins of the crisis. However, according to unpublished RAND Corporation research, constraints—such as in military-industrial capacity to produce large numbers of weapons in wartime—would remain.

A final consideration on Russia's mobilization readiness is the idea promoted by some in the Russian military and military science community that Russia and the United States are actually already "at war," which might justify the aforementioned preparations in addition to other more overt forms of aggression. Clearly, the proponents of this point of view do not have in mind a traditional war in which weapons are used to inflict damage on an opponent's military forces or territory. What these proponents believe is that the use of information operations, sanctions, and other forms of nonmilitary pressure could produce the same strategic political effect (regime change) as the use of military force, and that Russia must therefore take additional measures to ensure the stability of the state and regime in the face of such actions. This description of war does not fall within the traditional VPO typology previously described, although there are advocates within Russia who may want to modify existing thinking.³² The Ministry of Foreign Affairs pushed back against the characterization of the confrontation between Russia and the West as a "war," and has recommended that the usage of the term align with formal United Nations definitions.³³

³² Gareev, Derbin, and Turko, 2019.

³³ M. A. Gareev and N. I. Turko, "Voina: sovremennoe tolkovanie teorii i realii praktika," *Vestnik Akademii voennykh nauk*, Vol. 1, No. 58, 2017, pp. 7–8.

There has been an ongoing debate, even within the Russian military, about how war should be defined in the 21st century.³⁴ Although we have not seen any evidence that the VPO typology has been adjusted to reflect the ways in which the Russian military believes “wars,” in a broad sense, are waged, this discussion in Russian military thought bears attention because it could have implications for Russian actions in the future.

Russian Description of Military Threats

The last time Russia offered an official view of the military threats facing the country was in late 2014 with the publication of its Military Doctrine. The focus at that time was on the following: (1) the increased possibility of the protest potential within the Russian population being manipulated and potentially activated from the outside, (2) the need for a strategic nonnuclear deterrence capability within Russia’s strategic deterrence framework to respond to the proliferation of long-range precision munitions, and (3) the ability to counter the massed aerospace attack. Since that time, senior Russian officers and military science researchers have continued to expound on their views of military threats to the country.

On the China Threat

Before addressing Russian military threat perceptions since 2014, we briefly examine a notable shift in Russian assessments of the level of military threat emanating from China. In a 2001 military threat fore-

³⁴ See Gareev and Turko, 2017, pp. 4–11; E. A. Derbin, “Metodologicheskie aspekty analiza sushchnosti sovremennykh voyn,” *Vestnik Akademii voennykh nauk*, Vol. 1, No. 58, 2017, pp. 11–18; V. K. Kopytko, “K voprosu o sushchnosti voyny,” *Vestnik Akademii voennykh nauk*, Vol. 1, No. 58, 2017, pp. 19–21; N. N. Bolotov, “Sushchnost’ i sodержanie poniatiia ‘voina v informatsionnoi sfere,’” *Vestnik Akademii voennykh nauk*, Vol. 1, No. 58, 2017, pp. 22–28; A. D. Simonov, “Voina: sushchnost’ i sodержanie s evoliutsionnoi tochki zreniia,” *Vestnik Akademii voennykh nauk*, Vol. 1, No. 58, 2017, pp. 29–34; Iu. A. Matvienko, “Nevoennye ugrozy kak sostavnaia chast’ sovremennogo mezhgosudarstvennogo protivoborstvo,” *Vestnik Akademii voennykh nauk*, Vol. 1, No. 58, 2017, pp. 35–41; A. V. Dolgoplov, “Sovremennoe ponimanie sushchnosti i sodержanie voyny,” *Vestnik Akademii voennykh nauk*, Vol. 1, No. 58, 2017, pp. 41–47; and O. M. Gorshechnikov, A. I. Malyshev, and Iu. F. Pivovarov, “Problemy tipologii sovremennykh voyn i vooruzhennykh konfliktov,” *Vestnik Akademii voennykh nauk*, Vol. 1, No. 58, 2017, pp. 48–54.

cast to 2020, Andrei Piontkovskii and Vitalii Tsygichko found that the West did not present a threat to Russia because of NATO's lack of credible ground forces, the high vulnerability of the infrastructure of many European countries, and the perceived low acceptable-loss and damage thresholds for military casualties and infrastructure of the leadership and societies in developed Western countries.³⁵ Conversely, the analysts found that China posed the greatest security threat to Russia because of the PLA's preponderance of conventional forces, which were being completely overhauled; the high possibility of territorial expansion; its higher level of "acceptable damage" compared with that of developed Western countries; and, relatedly, its willingness to sustain heavy losses to achieve strategic objectives.³⁶

In the period from 2008 to 2012, the Chiefs of the General Staff and senior military analysts returned to the theme of the threat from China. In 2008, in a discussion of the need to improve "scientific situational forecasting," Makhmut Gareev, the former head of the Military Science Directorate of the General Staff, called attention to the "comprehensive state power" concept of the Chinese that must "automatically expand in directions where there is weakness and little resistance," and cited examples of expanding Chinese populations in Singapore, Malaysia, and Australia.³⁷ Two years later, the former Chief of the General Staff, Nikolai Makarov, listed the aspiration of China to

³⁵ A. A. Piontkovskii and V. N. Tsygichko, "Vozmozhnye vyzovy natsional'noi bezopasnosti Rossii v nachele XXI veka," *Voennaia mysl'*, No. 2, 2001, p. 64. As an example, the authors cite the withdrawal of American forces from Lebanon after a bombing claimed the lives of 300 American personnel in 1983.

³⁶ Piontkovskii and Tsygichko, 2001, pp. 63–70.

³⁷ Makhmut Gareev, "Natsional'nye interesy i natsional'naia bezopasnost' Rossii na sovremennom etape," *Vestnik Akademii voennykh nauk*, Vol. 1, No. 22, 2008, p. 13.

expand its “living space at the expense of border areas with Russia” in a summary of the primary threats facing Russia from Europe to Asia.³⁸

Since that time, public discussion of the other threats has continued while any negative sentiment toward China at senior military levels has been virtually nonexistent. Russia reportedly conducted a forecast in early 2014, not long after the crisis in Ukraine began, that found that a closer relationship with China carried reduced risk. The analysis contained some of the same research questions as those investigated by the 6th TsNII vis-à-vis China in the late 1970s, and in the military potential assessments that we described in Chapter Three. Aleksandr Gabuev and Vasilii Kashin, experts on Russia-China relations, explained the broad outlines of the analysis and conclusions, which are worth quoting in full:

Recognizing the need to strengthen partnership with China, in the spring of 2014 various Russian agencies analyzed the potential risks involved in cooperating with the PRC [People’s Republic of China]: before rushing into a warm embrace with Beijing, Moscow wanted to understand the limits of the safe participation of its giant neighbor in the Russian economy. Among other things, the leadership of the Russian Federation received a more comprehensive view of the main trends in the development of the Chinese military-industrial complex, China’s foreign policy, and priorities of its military strategic planning, as well as the presence of Chinese [workers] in Siberia and the Russian Far East.

The result of this work was a deeper understanding of the nature of the challenges that Russia’s long-term elevation of China bring. In particular, the analysis of the situation with the Chinese presence beyond the Urals has shown that Russia should not be afraid

³⁸ Other consistent military threats described throughout this period included Western attempts to ensure energy security to the detriment of Russia, and foreign border claims all along Russia’s periphery from Norway to Estonia to Japan (Kuril Islands). International border claims not involving Russia but also considered potentially threatening included Polish territorial claims against Belarus and Chinese claims against Kazakh territory (Makarov, 2010, p. 18).

of China's "creeping demographic expansion" into vacant territories: the number of PRC citizens in Russia is limited (according to various estimates, up to 500,000 citizens of China, half in the European part of the country)[;] the majority of Chinese labor migrants in the Far East stay there temporarily[;] and after the devaluation of the ruble in 2014, many Chinese began to return to their homeland in search of higher salaries. Thus, Moscow came to the conclusion that the ideas about the dangers of Chinese migration to the Far East, which were in the Russian media, the expert community and parts of the authorities, turned out to be unnecessarily alarmist, and the scenario of the future "annexation" of the territories of the Russian Federation to China according to a "Crimean scenario" completely unrealistic. In addition, the leadership of the Russian Federation received a more adequate idea of the internal transformation of the Chinese economy: the aging of the population, the reduction of labor, [and] policies to reduce the consumption of natural resources. For China, all these factors reduce the attractiveness (already extremely low) of the idea of some kind of struggle with Russia for control over the territories east of the Urals.³⁹

Official and Military Science Threat Assessments and Forecasts

The most recent official characterization of the military threats to Russia outside the 2014 Military Doctrine was offered by Gerasimov in a 2019 speech to the Academy of Military Sciences. He emphasized that the presence of western troops near the Russian border, the withdrawal of the United States from the Intermediate-Range Nuclear Forces (INF) Treaty (and possibly New START), and the militarization of space could "lead to a sharp deterioration in the military-political situation . . . to which we will have to respond with symmetric and asymmetric measures," the latter of which involves the identification and exploitation of weak points or critical nodes of the adver-

³⁹ Alexander Gabuev and Vasilii Kashin, *Vooruzhennaia družbba: kak Rossiia i Kitai tor-guyutsia oruzhiem*, Moscow: Carnegie Moscow Center, November 2017, p. 13.

sary, which could be military, economic, or societal.⁴⁰ In the military domain, Gerasimov explicitly stated that Russia in the event of a war would employ “strikes against the centers of command and control as well as against the sites from which cruise missiles could be launched against targets on Russian territory.”⁴¹

See Table 5.1 for a summary of themes in Gerasimov’s character of modern war and military threat assessments from 2016–2019.

Russian officials have concerns about the use of information and other tools to foment unrest and destabilize Russia or countries where Russian interests are at stake.⁴² According to the 2014 Military Doctrine, in the section entitled “Assessment of the International Situation,” the document noted a “shift of military dangers and military threats into the information space and internal domain of the Russian Federation.”⁴³ Furthermore, “the use of information and communication technologies for military-political objectives” was defined as a new external military danger to Russia. The new internal military dangers threatening Russia included “actions related to the informational influence on the population, first and foremost on the young citizens of the country, with the objective of undermining the historical, spiritual, and patriotic traditions in the sphere of defense of the Fatherland.” In August 2014, prior to the 2014 Military Doctrine’s publication, Putin stated that while there was not a direct military threat to Russia, there were “attempts to disrupt the social-political situation, and to one way or another weaken Russia.”⁴⁴ A year later, Putin returned to the issue of weaponized information, stating, “All sorts of means are employed for

⁴⁰ Gerasimov, 2019; Kartapolov, 2015, p. 35; Rod Thornton, “The Russian Military’s New ‘Main Emphasis,’” *RUSI Journal*, Vol. 162, No. 4, August/September 2017, p. 21; Popov and Khamzatov, 2018, p. 498; Tsygichko, 2002, p. 57; and Office of the Director of National Intelligence, *Assessing Russian Activities and Intentions in Recent US Elections: The Analytic Process and Cyber Incident Attribution*, ICA 2017-01D, January 6, 2017, p. ii.

⁴¹ Gerasimov, 2019.

⁴² Gerasimov, 2018, p. 17.

⁴³ President of Russia, 2014b.

⁴⁴ “Putin o politike sderzhivaniya RF, popytkakh diskreditatsii vlasit i azschite interesov biznesa,” TASS, March 26, 2015.

Table 5.1
Gerasimov Descriptions of Character of Warfare and Military Threats, 2016–2019

	Color Revolutions/ Hybrid Methods	Non-Contact Warfare	Information Confrontation	Global Integrated Operations	Multi-Domain Operations
	Political, economic, information, and/or diplomatic pressure applied against a target state to foment dissatisfaction with current government	Use of long-range conventional precision munitions to attack critical military and nonmilitary targets	Use of mass media, social media, other forms of communication to influence public opinion against current government; peacetime applications of cyber and EW capabilities	The ability to rapidly form, deploy, and command and control a joint force anywhere on the globe in response to a crisis	A project of the U.S. Army to be prepared to conduct multi-domain operations with other service branches in a single theater by 2028 and multiple theaters by 2035; long-range precision fires are a key element of the project
2016	X	X	X	X	
2017	X	X	X		
2018	X	X	X		
2019	X	X	X		X

the so-called deterrence of Russia—from attempts to politically isolate [Russia] to economic pressure to large-scale information war and tools of the special services.”⁴⁵ In 2018, General-Colonel Andrei Kartapolov, the head of the then–newly formed Military-Political Directorate of the Armed Forces, observed,

A transparent, very cynical information war is being waged against us on all fronts, and we must defend ourselves. In particular, the rampant propaganda and absolute lies . . . [alter] the political consciousness of society, which, in modern conditions, can lead to serious consequences. This is quite apparent in the instance of some of our neighboring states [e.g., Ukraine].⁴⁶

In conjunction with the changes to the “On Defense” law in 2013, Kartapolov’s quote suggests that Russian leadership, from the president downward, believes that the armed forces have a key role to play in managing the internal stability of the country in addition to managing external military threats.

With respect to external military threats, the National Security Strategy of late 2015, which addressed both military and security threats, highlighted the attempt by the “leading foreign countries” to achieve military dominance through “high-precision, information, and other high-technology means of conducting armed conflict [;] strategic nonnuclear arms [; and] the formation of a unilateral global missile defense system” among others.⁴⁷

In 2015, Sambu Tsyrendorzhiev, a senior researcher at the 46th TsNII, published the results of a military threat forecast to 2030 and 2045. According to Tsyrendorzhiev, the 46th TsNII played a “coordinating role” in eliciting the views of experts from a variety of Russian civilian academic and expert institutions to produce the forecast. The methodology used in the forecast was very similar to that outlined

⁴⁵ Irina Nagornyykh and Ivan Safronov, “Minoborony podklyuchaetsya k bor’be s ‘tsvetnymi revolyutsiami,’” *Kommersant*, June 24, 2015.

⁴⁶ Falichev, 2018.

⁴⁷ President of Russia, 2015.

in the *Framework* book (of which Tsyrendorzhiev was a lead author). Six scenarios, from “intense globalization” to “chaos,” were considered. Moderate globalization (America-centric) was considered to be the most likely of the six scenarios, followed by bipolarity 2.0 and moderate globalization (polycentric). Chaos and intense globalization were the only scenarios considered to be of low favorability for Russia. (Russia’s military potential in the intense globalization scenario described previously was roughly 50 percent of that of the United States.) The primary military threats and dangers found in this study and their likelihoods are presented in Table 5.1 and Figures 5.1 and 5.2, respectively. The realization of the aforementioned scenarios would affect the *level* of the military danger or threat to Russia because of the relative military potential (state power) correlation in each potential scenario. Notably, Tsyrendorzhiev considered participation of NATO in a contingency in Russia’s southwest strategic direction in his analysis of military threats—a possibility that was also raised by the IMEMO 2035 forecast, although in the latter case, the researchers predicted that such a clash might put the existence of the Russian state at risk and thus result in the preventative use of nuclear weapons.⁴⁸

The IMEMO 2035 forecast found that military threats from NATO would decrease in the event of two of the four of the possible VPO scenarios considered by the researchers—new polycentrism and regionalization without domination by a single power center. Consistent with official Russian thinking, these outcomes add more balance to the international system and theoretically reduce the level of tension because each regional power center (i.e., Russia, China, the United States) would feel more secure in their respective neighborhoods. On the other hand, a new bipolar order or intensified confrontation between Russia and NATO would to some extent increase the military threat to Russia, with the caveat that “the likelihood of a large war between the primary centers of power . . . would be less than in the first period of the Cold War (1947–1962).”⁴⁹ In fact, the use of military force would take the form of indirect support of friendly regimes

⁴⁸ Dynkin, 2017, p. 240.

⁴⁹ Dynkin, 2017, p. 254.

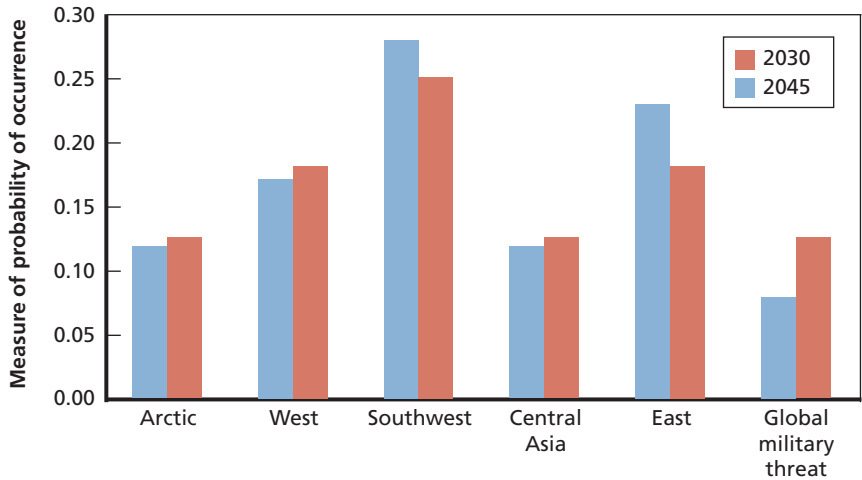
Table 5.2
Local and Regional Sources of Military Dangers and Threats to Russia to 2045

Region	Catalyst of Military Danger (Threat)	Source of Military Danger (Threat)
Arctic	Claims on control of natural resources in the Arctic shelf by other countries, damaging Russia's national interests	- United States - NATO
West	- Territorial claims by the Baltic countries, Poland, and Germany against Russia and Belarus - Efforts by the United States and the West to oust a geopolitical competitor and to create a rim of subservient border states in Eastern Europe	- United States - Baltics - Poland - Germany
Southwest	- Ukraine's territorial claims (with support from the United States and NATO) against Russia - Azerbaijan's claims (with support from Turkey) against Armenia in Nagorno-Karabakh - Georgia's vengeful intentions (with support from the United States and NATO) to reacquire the regions of Abkhazia and South Ossetia	- Ukraine - Azerbaijan - Georgia, supported by NATO
Central Asia	Claims of extremist Islamist organizations in Central Asia, Xinjiang-Uighur autonomous region in China, and North Caucasus and Volga regions in Russia on creating Islamic caliphates by carving out parts of territories in Russia, China, and Kazakhstan, and conducting power grabs in Tajikistan, Kyrgyzstan, and Uzbekistan	Extremist Islamist organizations, operating outside and within Russia's, Kazakhstan's, and other countries' borders
East	Japan's territorial claims on Kuril Islands, Sakhalin Island, Kamchatka Peninsula, and parts of the Primorskii region	- Japan - United States - South Korea

SOURCE: Tsyrendorzhiev, 2015.

and proxies or the punishment of adversaries within the context of greater competition between power centers. In general, a combination of military and nonmilitary means would continue to play a leading role in pursuit of strategic objectives of the West. In particular, the

Figure 5.1
Assessment of Probability of Occurrence of Foreign Military Threats to Russia's Security



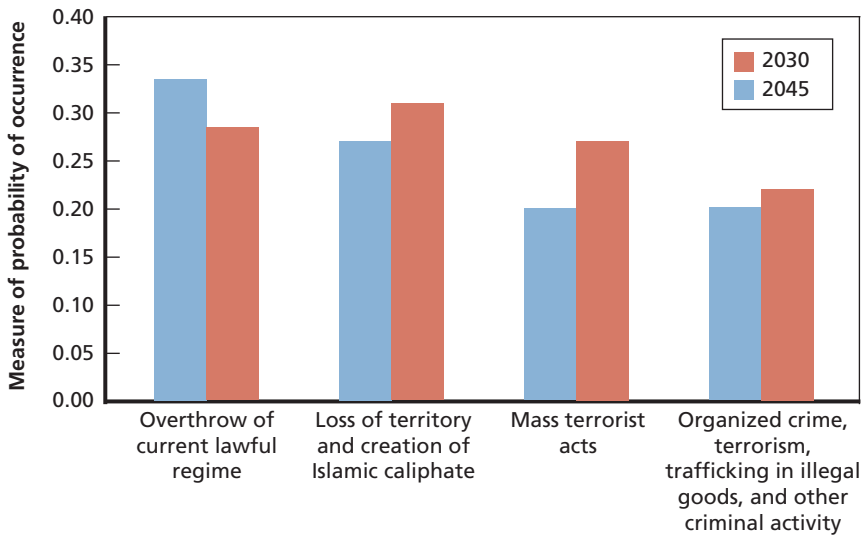
SOURCE: Tsyrendorzhiev, 2015. Adapted from image courtesy of East View Information Services.

NOTE: Based on a 0 to 1 Harrington scale (cumulative probability must equal 1).

forecast expected the continuation of the reliance on long-range precision munitions both as tools of military force and coercion, particularly in the scenario of intensified NATO-Russia confrontation; the use of special operations units in support of local opposition forces; and the disruption of economic and military-economic potential (i.e., sanctions and trade barriers) to weaken competitors.⁵⁰ A particularly dangerous threat among great powers with nuclear weapons would take the form of “using information assets and technologies for hostile purposes” and, possibly, cyberwarfare.⁵¹

⁵⁰ Dynkin, 2017, pp. 254–261. In this section, there is a chart that shows a deficit in strategic and intermediate range nonnuclear munitions for Russia relative to the United States. However, it is not clear exactly to what munitions the authors are referring, so we are not including this information in the main body of the report.

⁵¹ Dynkin, 2017, pp. 256–257.

Figure 5.2**Assessment of Probability of Occurrence of Domestic Military Threats to Russia's Security**

SOURCE: Tsyrendorzhiev, 2015. Adapted from image courtesy of East View Information Services.

NOTE: Based on a 0 to 1 Harrington scale.

To briefly summarize, what has been presented in this and the previous chapters represents the “inputs to VPO” in Figure 1.2. The degree of hostility between Russia and the United States and its allies is intensifying as the result of various geopolitical contradictions. Each side is taking actions across diplomatic, military, economic, and socio-political domains to either reinforce or resist the perceived dispersal of global power from the West. These actions are exacerbating the VPO, increasing the level of tension to somewhere between tense and crisis but not yet to the point where Russian military observers would declare that the likelihood of large-scale war is increasing. Nevertheless, actions seen as threatening either strategic stability or Russia’s strategic nuclear deterrence potential are viewed by Russia as particularly concerning. This view is perhaps the result of an overall military potential correlation that is more unfavorable to Russia than it was during the Cold

War in particular because of the enlargement of NATO at the expense of the Warsaw Pact, and the military, economic, and technological disparity that prevails as a result. Regardless, the military potential (or state power) comparison is presently a net negative for Russia.

What is left to explore within the framework is the residual threat to Russian military security. To recall, the *residual threat* is the extent to which Russia's strategic deterrence potential is unable to parry the actions described in the prior section on threat. The subsequent section will present Russian views on the state of Russian strategic deterrence capability in the military realm.

Nuclear and Strategic Nonnuclear Deterrence Potential

The Russian conception of strategic deterrence includes a broad spectrum of measures employed in both peacetime and wartime to convince an adversary of the “futility of achieving military and political objectives through force” and to “contain an [adversary] within certain boundaries.”⁵² The military component of the strategic deterrence system is especially relevant in the context of a negative military potential correlation with a stronger power, and it consists of strategic nuclear and nonnuclear potential. Nuclear potential consists of the aggregate capabilities of Russia's strategic nuclear forces—air, land, sea-based—to inflict unacceptable damage (an assigned metric) on an adversary's political, economic, and population centers.⁵³ *Nuclear potential* likely also consists of tactical nuclear weapons, of which the intention is less clear in Russian military thought.⁵⁴ A leading Russian text on strategic deterrence from 2011 suggested that one of the roles of

⁵² V. M. Burenok, Yu. A. Pechatnov, and R. G. Tagirov, “K voprosu ob opredelenii urovnei nepriemlemosti posledstviu pri reshenii zadachi silovogo strategicheskogo sderzhivaniia,” *Vestnik Akademii voennykh nauk*, Vol. 1, No. 26, 2009, p. 45; and Ministry of Defense of the Russian Federation, “Sderzhivanie strategicheskoe,” *Voenno-entsiklopedicheskii slovar'*, webpage, undated-c.

⁵³ A.G. Burutin, et al., “Kontseptsii nepriemlemogo ushcherba: genezis, osnovnye prichiny transformatsii, sovremennoe sostoianie,” *Vooruzhenie, Politika, Konversia*, Vol. 4, 2010, p. 5; and Tsyrendorzhiev, 2014, p. 37.

⁵⁴ Dmitry Adamsky, “Nuclear Incoherence: Deterrence Theory and Non-Strategic Nuclear Weapons in Russia,” *Journal of Strategic Studies*, Vol. 37, No. 1, 2014.

tactical nuclear weapons was to inflict damage on counterforce (military) targets.⁵⁵ Some Russian experts on deterrence have argued that the role of nuclear deterrence in the 21st century is decreasing while the role of strategic nonnuclear weapons is increasing because of several factors, not least of which is the clear recognition on all sides of the lose-lose effects of employing strategic nuclear weapons and the more-ambiguous escalation outcome resulting from employing long-range conventional precision munitions.⁵⁶

Nonnuclear deterrence potential is defined inconsistently in Russian writing on strategic deterrence. The conceptual divergence emerges between what constitutes nonnuclear deterrence forces. The broad description includes offensive and defensive assets, such as long-range precision munitions, electronic warfare, and air and missile defense.⁵⁷ The narrow conception, which we will use, refers to long-range precision munitions that are capable of inflicting assigned damage to critical targets—particularly those related to NATO execution of a massed aerospace attack, such as air bases, naval platforms, and command and control points—which could be located thousands of kilometers even from Russia's most western points.⁵⁸ The latter formulation in our view is more consistent with Russian thinking on deterrence achieved through damage of critical military and nonmilitary infrastructure, although it is not clear cut.

In 2011, Russia intensified its investment in a military modernization effort across the armed forces that had been ongoing on a smaller scale since the early 2000s. A stated objective of this investment was to upgrade Russia's strategic nuclear deterrence potential. As of 2020, Russia's strategic nuclear forces had received 140 SS-27 Mod 2 intercontinental ballistic missiles (ICBMs), 48 SS-N-32 submarine-launched ballistic missiles (SLBMs), and 252 AS-23B nuclear-capable

⁵⁵ V. M. Burenok and Yu. A. Pechatnov, *Strategicheskoe sderzhivanie*, 2011, p. 158.

⁵⁶ Yu. A. Pechatnov, "Metodicheskii podkhod k opredeleniyu sderzhivayushchego ushcherba s uchetom sub"ektivnykh osobennostei ego vospriiatiia voriatnym protivnikom," *Vooruzhenie i ekonomika*, Vol. 3, No. 15, 2011, p. 23.

⁵⁷ Kofman, Fink, and Edmonds, 2020, p. 54.

⁵⁸ Burenok and Pechatnov, 2011, p. 110; and Burenok, 2018b, pp. 139–140.

air-launched cruise missiles (ALCMs); these weapons and a large stockpile of legacy missiles provide Russia the ability to deploy just under 1,500 nuclear warheads on strategic weapon systems.⁵⁹ Additionally, experts estimate that as of 2020 Russia possesses approximately 1,870 nonstrategic nuclear warheads, although a key question revolves around delivery platforms that in many cases could be used for non-nuclear purposes.⁶⁰

Russia's nonnuclear deterrence potential, as defined in this section, is less developed. Russian efforts to produce long-range precision munitions in consequential quantities only began in the early 2010s when Russian analysts assessed that the United States already possessed up to 12,000 long-range cruise missiles and ballistic missiles with conventional payloads.⁶¹ According to what little data are available, Russia's military-industrial complex does not appear to be delivering large numbers of missiles on an annual basis. This may have had an impact on Russian thinking regarding the employment of these weapons a decade ago. The aforementioned 2011 text argued that "[t]here is no alternative for the Russian Federation over the long-term [i.e., 10–15 years] to the idea that the resolution of the nonnuclear deterrence task should be oriented toward the countervalue concept [i.e., to inflict damage on civilian and economic infrastructure]."⁶² But more-recent discourse has suggested at least a modification in Russian military thought. In 2019, Gerasimov stated that military targets associated with launching cruise missile attacks against Russian territory would be prioritized in a conflict, although he did not specify the types of payloads that would be on the long-range munitions required

⁵⁹ Hans M. Kristensen and Matt Korda, "Russian Nuclear Forces, 2020," *Bulletin of the Atomic Scientists*, Vol. 76, No. 2, p. 102.

⁶⁰ Kristensen and Korda, 2020, p. 102. In 2012, a Russian report cited approximately 2000 "operational-tactical" nuclear weapons in the Russian arsenal as a consensus figure. See Aleksei Arbatov, Vladimir Dvorkin, and Sergei Oznobishchev, *Rossia i dilemmy iadernogo razoruzheniia*, Moscow: Institute of World Economy and International Relations, Russian Academy of Sciences, 2012, p. 123.

⁶¹ Arbatov, Dvorkin, and Oznobishev, 2012, p. 85.

⁶² Burenok and Pechatnov, 2011, p. 160.

to execute this task.⁶³ (It is also possible that nonkinetic means, such as cyber weapons, could be used to facilitate the execution of critical infrastructure destruction or degradation.)

According to a 2019 report by the Swedish Defence Research Agency (FOI), the missile numbers have not risen substantially, regardless of their intended targets.⁶⁴ FOI estimated that as of 2019, Russia possessed 1,359 “stand-off strike assets,” with ranges from 350 to 3,000 km. A Russian source stated that in the case of the Kalibr cruise missile—there are several variants—the Russian military-industrial complex produced approximately 100 per year from 2016–2019.⁶⁵ This perhaps explains why Russian military analysts have noted the possibility that Russia’s tactical nuclear weapons serve as a compensatory capability to make up for a shortfall in conventional long-range precision munitions or have suggested that they would be most effective in the Russian case for countervalue targeting.⁶⁶

Although Russian military thought delineates between deterrence forces from general purpose forces, it is important to note that Russia possesses a relatively large conventional military. In the European part of the country alone there are six combined arms armies consisting of approximately 150,000 troops, 1,500 tanks, 450 multiple rocket launchers, 1,000 pieces of artillery, and hundreds of tactical air defense systems. These forces are supported by between 400 and 500 tactical aircraft, hundreds of attack helicopters, over 40 long-range surface-to-air missile battalions, and three navy fleets. Since 2011, well over 50 percent of these systems, in most cases, have been modernized or replaced with new versions, and the personnel themselves are more professional because a greater percentage of them serve on contract. The

⁶³ Gerasimov, 2019.

⁶⁴ Fredrik Westerlund and Susanne Oxenstierna, eds., *Russian Military Capability in a Ten-Year Perspective – 2019*, Stockholm: FOI, FOI-R--4758--SE, December 2019, p. 37.

⁶⁵ S. F. Vikulov, ed., *Aktual'nye problemy realizatsii voenno-ekonomicheskogo potentsiala Rossii v pervoi chetverti XXI veka i osnovnye napravleniia voenno-ekonomicheskikh issledovaniï*, Book 2, Kantsler, 2019, p. 101.

⁶⁶ Burenok and Pechatnov, 2011, pp. 156–157; and Arbatov, Dvorkin, and Oznobishchev, 2012, p. 87.

Russian plan to 2027 is to continue this ongoing modernization effort with an emphasis on novel weapon systems and unmanned systems to augment more-traditional military capabilities.⁶⁷ This force development (and posture) has caused alarm in some U.S. analyses of the conventional force balance in Europe, although the Russians claim that the conventional balance is not in Russia's favor.⁶⁸ The primary role of the general purpose forces is to quickly respond to a security crisis along Russia's periphery and localize an armed conflict so that it does not escalate to a war in which the military potential of a stronger adversary could be brought to bear.⁶⁹

Regardless of some Russian concern over conventional force ratios, senior Russian leadership has stated that the country has sufficient nuclear and nonnuclear capability for the foreseeable future because of the modernization program that received a large influx of resources beginning a decade ago. In 2020, Shoigu declared that Russia had achieved "strategic parity" with NATO because of the increased combat potential of the Armed Forces and the "buildup of [Russian] deterrence potential."⁷⁰ Putin similarly asserted that Russia's defense capability was assured for decades to come because of Russia's modernization of its strategic nuclear arsenal.⁷¹ A senior Russian military expert explained in 2018 that, as a result of enhanced measures to overcome American missile defenses, fewer than eight RS-28 "Sarmat"

⁶⁷ Bogdanov, 2018.

⁶⁸ Scott Boston, Michael Johnson, Nathan Beauchamp-Mustafaga, and Yvonne K. Crane, *Assessing the Conventional Force Imbalance in Europe: Implications for Countering Russian Local Superiority*, Santa Monica, Calif.: RAND Corporation, RR-2402, 2018; Arms Control Association, "Russia's View on Nuclear Arms Control: An Interview with Ambassador Anatoly Antonov," April 2020; and A. E. Sterlin and A. L. Khiapin, "Ob osnovakh gosudarstvennoi politiki Rossiiskoi Federatsii v oblasti iadernogo sderzhivaniia," *Krasnaia zvezda*, August 7, 2020.

⁶⁹ Tsyrendorzhiev, 2014, p. 38.

⁷⁰ Ministry of Defense of the Russian Federation, "Ministr oborony vystupil na zasedanii Soveta Federatsii v ramkakh 'pravitel'stvennogo chasa,'" Department of Information and Mass Communication, webpage, March 25, 2020.

⁷¹ Vladimir Putin, "Presidential Address to the Federal Assembly," Moscow, January 15, 2020.

missiles (each of which likely carries at least 10 multiple independent reentry vehicles) would be required to “practically destroy all American industry.”⁷²

Conclusion

The descriptions of the actions influencing the VPO and military threats suggest that the perceived external fomenting of internal unrest, whether in Russia or along its periphery, is arguably the most consequential trend affecting Kremlin and MOD decisionmaking and planning. The developing military capabilities of NATO are seen in some cases as disruptive to strategic stability (a long-term problem) but more often are forecasted as potential opportunistic follow-ons to societal disruptions in the former Soviet space (an acute problem). An implication of this is that Russia is likely to act preemptively and potentially forcefully to a potential scenario that suggests the repetition of what it has observed in Iraq, Libya, and Ukraine. The intensity and scale of the reaction may depend on the degree of threat to Putin’s hold on power or on the loss of influence in areas of strategic interest for the Kremlin.

Russia clearly sees the United States as the primary influence on the development of the global VPO and regional VPO in Europe and Asia. Russian military leaders have consistently pointed to existing territorial grievances in both regions that have the potential to evolve into a military conflict, and in nearly all of these cases the United States could play a direct or indirect role. The use of sanctions, information operations, diplomatic support, and military exercises and training are among the tools the United States and its allies can use to consolidate their influence to achieve political and economic objectives along Russia’s periphery. Moreover, the continued U.S. development of missile defense and conventional and nuclear strike technology, in addition to “nontraditional” weapons and military equipment, threaten Russia’s

⁷² V. M. Burenok, “I oruzhie Sudnogo dnia,” interview, *Zashchita i bezopasnost’*, Vol. 85, No. 2, 2018a, p. 7.

ability to impose its will and achieve desired political outcomes in its neighborhood. Russia, for its part, is attempting to mitigate these and other threats with both offensive and defensive capability development and employment, apparently with some effect.

From the aforementioned remarks of Putin and Shoigu and Russian characterizations of the VPO, we can conclude that Russian decisionmakers actually feel relatively secure in the country's position vis-à-vis the United States at a strategic level. Put another way, drawing on the analytical framework we are using for this analysis (Figure 1.2), Russia's strategic deterrence potential is seen by the Ministry of Defense as satisfactory in mitigating current threats such that the "residual threat" to Russian military security is low.

The extent to which this conclusion will affect Russian behavior going forward is difficult to predict. However, one could hypothesize that Russia will continue to be assertive in its approach to foreign policy or may even intensify its pursuit of national interests both regionally and globally because of growing confidence among Russian leadership in its ability to parry existing threats. At the same time, we did not find any evidence that Russian decisionmakers believe that the country's renewed conventional and nuclear armed forces potential translates into equal military potential with the United States or NATO. The available evidence within the Russian expert community suggests this is far from the case, and the existing military potential disparity could worsen in the coming decades. Russia's strategic choice to align more closely with China also indicates that Moscow recognizes its own limitations. What we can conclude from this dichotomy—of "strategic parity" on the one hand and inferiority in overall military potential on the other—is that Moscow may be more confident in pursuing its interests so long as that does not risk direct confrontation with a stronger power. Indeed, recent history has shown that if Russia can take actions to weaken the United States and the West to narrow the gap while avoiding war, it may do so, as was the case in the intervention in the 2016 U.S. elections.

Conclusion

Military forecasting is an important component of Russian strategic planning. The basic requirements of the forecasts involve producing realistic scenarios for the development of the VPO and the aggregate military potentials of VPO actors, including Russia, the United States, and China. The combination of this information—the geopolitical trends, the strategic intentions of potential adversaries, and the projected balance of power—allows Russian analysts to assess the level (and character) of military threat to the country and identify areas of weakness to address.

In reality, there are many forces at play within the Russian defense, security, and political system that will ultimately affect decisions made in the Kremlin. As Sergei Belokon' stated, even within the General Staff the planning process is not streamlined; there are disparate methods in use that produce individual outputs required for decisions on force structure and training. At the same time, our findings have demonstrated that the required *inputs* for strategic planning have remained relatively consistent over the past five decades. The VPO, military-political potential, military-economic potential, armed forces potential (based on combat potential values), and scientific-technical potential of Russia and other military powers are the most common indicators that the Russian MOD has sought to understand through military forecasting. This continuity in the analytic process lends credibility to using these concepts to draw conclusions about how the Russian military measures itself against its competitors.

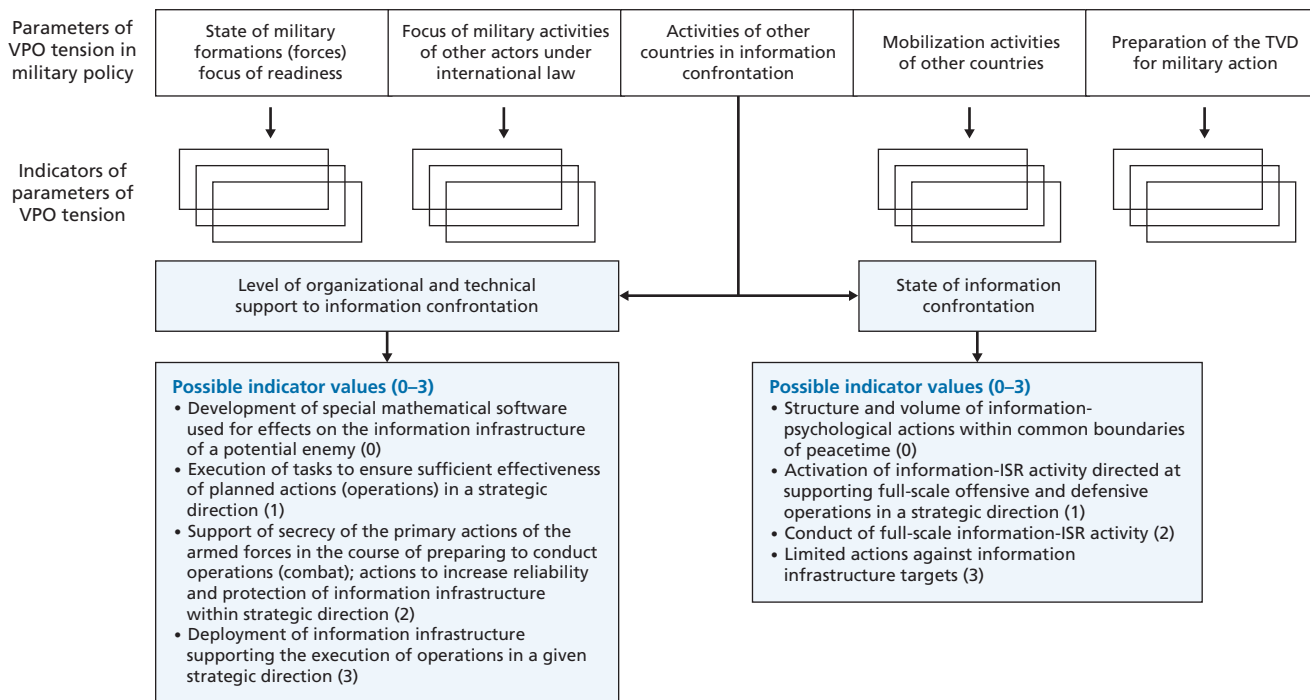
For those seeking to understand the Russian view of the state of great power competition with the United States and other powers, this report's examination of the aforementioned indicators could provide some answers depending on how the competition is defined and what each side is trying to achieve. On a broad level, this report shows that Russia is competing for influence around the world from a position of weakness, which will make it difficult to change the behavior of a stronger opponent in some cases. This is not to say that Russia is impotent in its ability to shape foreign policy outcomes. Rather, over the next two decades—with power dynamics remaining as they stand today and with U.S. alliances and political and economic systems intact—Russia will be challenged to sustain a competition for influence with the West, particularly in Europe and Asia, because it will not be able to rely on its military alone to intimidate or coerce target audiences.

The regional and global military force posture requirements to keep the ongoing confrontation at a level below great power war will remain a moving target for the foreseeable future. There are differing views on how best to accomplish deterrence of Russian aggression, but from a strictly military perspective, this report suggests that a key consideration will be the impact (or lack thereof) of future U.S. and allied force posture decisions on Russia's strategic nuclear deterrence potential. Based on the framework shown in Figure 1.2, this is an important factor in Russian assurance of the defense of its territory and the regime, particularly in the context of relative Russian weakness in overall military potential. At the same time, to ensure that the competition remains at the nonmilitary level (i.e., the avoidance of great power war), NATO must maintain sufficient strike capability to credibly threaten unacceptable and deterrent damage on Russian military, military-economic, and other critical targets to achieve deterrence as Russia defines it. Determining whether future force posture actions strike a balance between these two considerations could be a first step in effective defense that stays below the Russian threshold to escalate to the use of armed force.

Indicators of Information Confrontation

Figure A.1 indicates the information confrontation parameters, as described in Tsyrendorzhiev (2014).

Figure A.1
Escalation Indicators in Information Confrontation Parameter of the VPO



SOURCE: Tsyrendorzhiev, 2014. Adapted from image courtesy of East View Information Services.

VPO Assessment and Forecast Methodology

VPO Methodology

The Soviet apparatus for assessing the military threat to the country included many elements outside the MOD, not least of which was the KGB. However, military forecasting primarily fell under the purview of the General Staff and in particular the GRU. The 10th directorate managed “economic information,” for instance, producing official annual reports on the military-economic potential of key foreign countries.¹ Supporting the Soviet GRU were NIIs that also conducted strategic forecasts and other military analysis. For example, in the 1970s the 6th NII oversaw modeling that provided insight into the military potential of adversaries, the expected outcome of notional NATO–Warsaw Pact wars in Europe, and the effects of nuclear weapons strikes.²

Additionally, civilian institutions, such as IMEMO and other institutions, reportedly produced unofficial military-economic potential assessments of foreign countries under the oversight of an NII of the Soviet MOD.³ As discussed in greater detail in Chapter Three, this work is still done across several civilian institutions and within the Russian MOD, the latter of which includes the 46th TsNII of the MOD, the MOD Center for the Study of the Military Potential of Foreign

¹ Valentin Mzareulov, “10-e upravlenie,” *Shield and Sword*, webpage, undated.

² “6 TsNII MO RF – 55 let,” 2017; this organization is variably referred to as the 6th TsNII and the 6th NII MO.

³ Vitalii Shlykov, “Genshtab i ekonomika,” *Voenno-promyshlennyyi kur'er*, November 19, 2018.

Countries (*Tsentr issledovaniï voennogo potentiala zarubezhnykh stran*), and other organizations.⁴ In 2014 and 2015, for example, the 46th TsNII MO played a “coordinating role” to produce global military-political forecasts to identify possible military threats to Russia (see Chapter Five).⁵ The institutions that participated in this work included Bauman Moscow State Technical University, MGIMO, the Institute of the United States and Canada, and the research organizations of the Ministry of Economic Development and the Russian Academy of Sciences.

The Russian military continues to collect data on a broad variety of indicators to formulate VPO assessments and forecasts. In 1999, the former Chief of the Main Operations Directorate of the General Staff, General-Colonel Viktor Baryn’kin, described in detail how the official VPO assessment (*otsenka*) and forecast (*prognoz*) were generated for senior military leaders and policymakers.⁶ Baryn’kin’s explanation of the methodology carries particular weight given his position at the time of the article’s publication. More-recent Russian sources on the VPO, which we address later in this section, generally align with his description, although there is some discrepancy in the role of the correlation of aggregate potentials; at times it is described as input to the VPO, while in other instances it is assessed and forecasted separately.

According to Baryn’kin, as of the late 1990s, the VPO assessment began with the identification of the object of study—local, regional, global VPO—and a research plan was subsequently developed. The next phase involved the collection of a large amount of data from specialists across the Russian government, MOD, and civilian institutions, on both internal and external military, political, and economic condi-

⁴ Notably, the MOD Center for the Study of Military Potential of Foreign Countries was originally known as the 6th TsNII MO, which was created by a Soviet General Staff directive in 1962 to conduct systematic research on “military-technical information.” In 1973, the TsIVTI MO was formed on the basis of the 6th TsNII with an additional role of forecasting the military potential of foreign countries. In the late 1990s, the institute was reformed again into its current structure and title within the Russian MOD. See “6 TsNII MO RF – 55 let,” 2017.

⁵ Tsyrendorzhiev, 2015, p. 10.

⁶ Baryn’kin, 1999.

tions (see Table B.1), among others. General Staff officers then input these data into a VPO model that provided an assessment of the present situation as well as a forecast for possible changes over time. Finally, the results characterizing the nature of current and future threats to military security were published and presented to senior military and political leaders.⁷

Given the amount of data that potentially could be collected to produce a VPO assessment, there were several constraining factors that provided scope to the overall effort. For example, a limited number of realistic future scenarios using specific variables needed to be developed for the model. Second, the Russian military was not gathering information on countries located far from Russia with little or no ability to project military power. Countries (referred to in Russian as “VPO subjects” in this context) that possessed large militaries and were capable of using military force were the primary focus of the VPO assess-

Table B.1
VPO External Data Collection

Data Category	Data Type	Source
Official public documents	Speeches, military doctrines, declarations	Senior leadership
Agency and nonofficial reports	Publications relating to strengths and weaknesses in military and other sectors	Government agencies, academia, industry
Mass media	Latest developments across political, economic, military, social domains	Newspapers, television, journals
Secret materials	Military/policy plans, weapons development, and other data	Government, defense-industrial complex, other industry

SOURCE: Baryn'kin, 1999.

⁷ Baryn'kin, 1999.

ment.⁸ (According the Burenok study in 2018[b], the “primary centers of power that influence the global [VPO]” included the United States, Russia, China, Great Britain, Germany, Iran, Israel, and North Korea, among others—see Table B.2 for full list).⁹ Working from that starting point, the interests, intentions, alliances, demographics, science and technology development, aggregate military potential (a broad measure that includes several elements of state power such as political, economic, and military potential—see Chapter Three), the quantity and quality of the armed forces (i.e., COFM), the disposition of military forces, and trends in the character of modern warfare were all important factors that drove the data collection effort and influenced the VPO.¹⁰ Significant changes in any or some combination of these categories between the periods of analysis could have affect how the General Staff assessed military threats and considered potential responses.

Following the collection and analysis of the data, the General Staff typically characterized the VPO as one of the following five conditions: calm, tense, crisis, military conflict, or all-out war. These conditions and the accompanying language to support the overall conclusions were the intended output of the VPO assessment and forecast, the former of which related to day-to-day monitoring of threats and military decisionmaking while the latter served as a tool for strategic planning. In addition to providing senior leaders with current information and forecasts to inform defense and security decisions, the VPO was disseminated down the chain of command as the broad geopolitical context for lower-level commanders and officials. As Baryn’kin wrote, “The results of the . . . VPO assessment in this case are reflected in the introductory parts of the main guidance documents of the senior commander . . . and his staff: in directives, orders, memoranda, assignments.”¹¹

⁸ Baryn’kin, 1999.

⁹ Burenok, 2018b, pp. 276–277.

¹⁰ Baryn’kin, 1999.

¹¹ Baryn’kin, 1999.

Based on a review of VPO-related analysis across the Russian military science and expert community, the general inputs for conducting modern VPO assessments and forecasts—which are done officially within the General Staff and by Russian military science and academic researchers—have not changed significantly from those presented by Chuev and Mikhailov in 1975 and Baryn'kin in 1999 (see Table B.2). VPO forecasts are usually discussed in the context of the aforementioned VPO scenarios that may consider short-term (five years), medium-term (five to ten years), or long-term (over ten years) futures. These forecasts are conducted either with the help of a model or through expert surveys. For the purposes of our analysis, the most important aspects are the *inputs* most commonly associated with VPO analysis, which we located in the available Russian literature and evaluated to gain a sense of conclusions that could inform strategic planning of the General Staff and how Russia measures itself against other countries across a broad spectrum of indicators of state power (military potential).

As can be seen in Table B.1, the Russian military science and broader defense community continue to use or cite similar inputs to understand the present and future VPO.¹² Although there is not always terminological or methodological consistency in the literature, the assessment and forecast of various types of potential—economic, political, military, technological—are often grouped together in analyses of state power or military potential. The present and future state of military-political relations, the analysis of which tends to stem from the leading geopolitical trends and countertrends (*protivorechiia*) in international affairs discussed previously, is also important. The global, regional, and local COFM, which we examined in a previous RAND report, are also critical planning factors because force imbalances or sharp changes in combat potential to the status quo can affect the VPO at various levels—global, regional, local—in peacetime.¹³

¹² The idea of *potential* is common throughout Russian military literature and, by some analysts, is distinguished from *power* (*moshch'*) in that the latter concept is the realization of potential under specific conditions; see Burenok, 2018b, pp. 307–308.

¹³ Tsyrendorzhiev, 2014, pp. 35–36.

Table B.2
Selected VPO Input Information

Source	Year of Publication	Affiliation	Selected VPO Inputs	Global "Centers of Power"
Chuev and Mikhailov	1975	Applied Problems Section, Soviet Academy of Sciences ^a	Military-strategic forecast, operational-tactical forecast, military-economic forecast, military-technical forecast	
Baryn'kin	1999	Main Operations Directorate of the General Staff	COFM, military plans, weapons development, economic, political, social trends	
Tsyrendorzhiev	2014	46th TsNII	Foreign policy, military, economic, and sociopolitical parameters	
Podberezkin	2015	MGIMO	Economic, moral-political, demographic, financial potentials; natural resources; national interests; network potential	
Popov and Khamzatov	2018	Independent military analysts	Military, economic, technological, information potentials; military-political relations; internal political situation	
Burenok	2018b	RARAN; 46th TsNII; INES; MOD Center for the Study of the Military Potential of Foreign Countries	Aggregate potentials (e.g., military, military-economic, technological), network power, military-political relations, COFM	United States, Brazil, Great Britain, France, Germany, South Africa, Egypt, Israel, Saudi Arabia, Turkey, Iran, Russia, Pakistan, India, China, North Korea, South Korea, Japan

Table B.2—Continued

Source	Year of Publication	Affiliation	Selected VPO Inputs	Global “Centers of Power”
Federal Security Service (FSB) course on the VPO ^b	Post-2015	Unknown	Aggregate military power (potential); interests and relations of military-political actors	

^a General-Lieutenant Yurii Chuev was the Director of the Applied Problems Section of the Soviet Academy of Sciences (SPP SAN), likely in the 1970s.

^b Aleksandr Pozdniakov, “Metodologiya otsenki voenno-politicheskoi obstanovki v interesakh obespecheniya gosudarstvennoi bezopasnosti Rossiiskoi Federatsii,” lecture, Moscow, undated. Based on the literature cited, this lecture was given sometime after 2015.

The Russian Process for Determining Critical Technologies

Definitions

In the discussion about the most important technologies for future warfare and strategic competition, Russian policy and legal documents use three terms: critical technologies (*kriticheskie tekhnologii*), advanced technologies (*peredovye tekhnologii*), and prospective technologies (*perspektivnye tekhnologii*). It appears that the term *critical technologies* has a narrow meaning in Russian literature, one that is related exclusively to the government planning process, while *advanced technologies* and *prospective technologies* are used in a more-general way; the latter also appear more often in speeches and white papers. This distinction can be illustrated by the Russian Military Doctrine, which defines the following tasks of military-industrial complex:

The development of a set of *priority* technologies that ensure the development and production of *prospective* systems and models of weapons, military and special equipment [general formulation]. . .

The development, maintenance and implementation of military and civilian basic and *critical* technologies, which ensure the development, production and maintenance of *prospective* weapons, military and special equipment, as well as allow for technological breakthroughs or an advanced science and technology base

in order to develop fundamentally new models of weapons, military and special equipment with previously unseen capabilities.¹

The term *critical technologies* was introduced to Russian legislation in 1996 by the Government Commission on Science and Technology Policy, in the “Priority areas for the development of science and technology. Critical technologies at the federal level,”² which became a regularly updated document approved by a presidential decree. The Explanatory Note to its latest version provides the following definitions:

A priority area is a thematic area of scientific and technological development of inter-industry (interdisciplinary) significance, capable of making the greatest contribution to country’s security, accelerating economic growth, and increasing the country’s competitiveness by developing the technological base of the economy and knowledge-intensive industries.

Critical technology is a complex of intersectoral (interdisciplinary) technological solutions that create the prerequisites for the further development of various technological areas, which have a wide potential range of competitive innovative applications in various sectors of the economy and, together, make the largest contribution to the implementation of priority areas for the development of science and technology.³

The list of critical technologies refers mostly to civilian technologies. It includes, however, a broad category of “basic and critical military and industrial technologies for creating advanced types of weapons, military and special equipment,” which is then specified in three

¹ President of Russia, 2014b.

² T. A. Makarenko and V. A. Agafonov, “Rol’ i mesto kriticheskikh tekhnologii v ekonomike Rossii i razvitykh stran,” *Strategiya razvitiya ekonomiki*, Vol. 153, No. 12, 2012, p. 38.

³ President of Russia, Ukaz Prezidenta Rossiiskoi Federatsii ot 07.07.2011, No. 899: Ob utverzhdenii prioritnykh napravlenii prioritnykh napravlenii razvitiia nauki, tekhnologii i tekhniki v Rossiiskoi Federatsii i perechnia kriticheskikh tekhnologii Rossiiskoi Federatsii, July 7, 2011.

additional documents: the “list of basic and critical military technologies” (MOD area of responsibility), the “list of basic and critical industrial technologies” (Ministry of Industry and Trade), and the “list of basic and critical special technologies” (FSB). Based on that division, Burenok (2009) proposes a terminological framework, presented in Figure C.1.⁴

Policy Framework

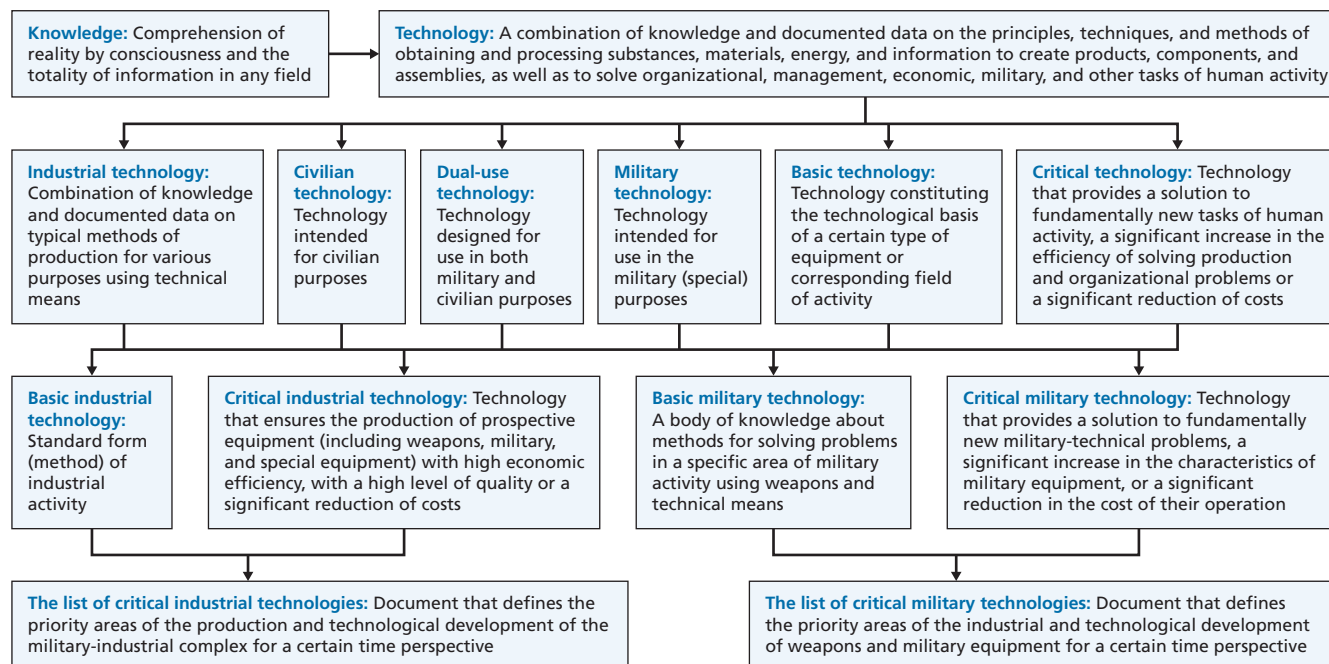
Burenok (2009) discusses the target program planning cycle for weapons development as a four-stage process, comprising planning, programming, budgeting and implementation phases, where the choice of critical technologies occurs within the *planning* phase. However, the literature suggests that the sequence between these steps is not necessarily linear because the same institutions are involved in multiple stages of this process, and thus have a strong incentive to make strategic choices early on; namely, entities that rely on government contracts propose technologies that they believe should be included in the documents setting priorities for future research. It is relevant, therefore, how the selection of critical technologies fits into a broader policy and institutional framework. Figure C.2 presents the most relevant planning documents.

Strategic planning and doctrinal documents provide general guidance on the character of threats and the tasks of the Armed Forces and the military-industrial complex. For example, the Military Doctrine defines objectives of the development of the Armed Forces in the following way:

To bring their structure, composition, strength and equipping with modern (prospective) types of weapons, military and special equipment in line with the forecasted military threats, the character and nature of military conflicts, the tasks [of the Armed Force] in peacetime, in crisis and escalation, and in wartime, as well as with the political, socio-economic, demographic and

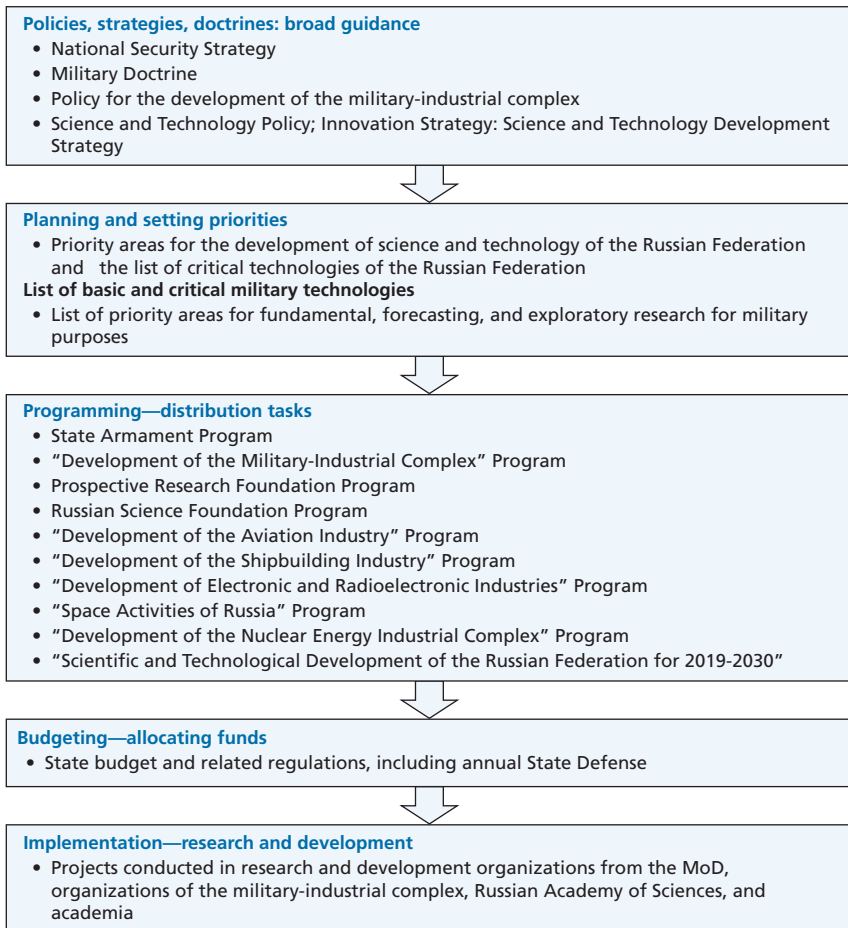
⁴ Burenok, 2009, p. 45.

Figure C.1
Technology-Related Terminology



SOURCE: Burenok et al., 2009. Adapted from image courtesy of East View Information Services.

Figure C.2
Policy Framework



SOURCES: President of Russia, "On Strategic Planning in the Russian Federation," No. 172-FZ, June 28, 2014a; Government of Russia, "The Procedure for the Development, Implementation and Evaluation of the Effectiveness of State Programs of the Russian Federation," No. 588, August 2, 2010; President of Russia, "On the State Defense Order," No. 275-FZ, December 29, 2012d; President of Russia, "On Security," No. 390-FZ, December 28, 2012c; and Ministry of Economic Development of the Russian Federation, *Development of Projects of State Programs of the Russian Federation*, 2017.

military-technological conditions and capabilities of the Russian Federation.⁵

Policy documents regarding scientific and technological development define the lower levels of the regulatory pathway. For example, Science and Technology Policy defines the *priority areas for the development of science and technology of the Russian Federation and the list of critical technologies of the Russian Federation* as the document that determines the state's priorities in the field of scientific, technological, and technical development.⁶ In addition to the policies approved by the President or the Prime Minister, there are also conceptual sectoral documents, such as the *framework for creating the scientific and technological base for advanced weapons and military equipment for the period from 2016 to 2025*, which was approved by the Minister of Defense in 2014.⁷ The framework defines the main objectives and principles of building a scientific and technical base (STB) and determines the structure, composition and organization of work required to create the framework.⁸

At the planning level of the policy framework presented in Figure C.2, the list of basic and critical military technologies is an extension of the list of critical technologies focused on technologies for military use. Along with the list of priority areas for fundamental, prognostic, and exploratory research in the interests of ensuring the country's defense and state security, it defines the priorities in the development of the STB in support of prospective and nontraditional weapons, military, and special equipment. Each military technology

⁵ President of Russia, 2014b.

⁶ President of Russia, "Fundamentals of the Policy of the Russian Federation in the Field of Science and Technology for the Period up to 2020 and the Future Perspective," approved by the President of the Russian Federation on January 11, 2012, No. Pr-83, January 11, 2012a.

⁷ Kokoshin, 2017, p. 346.

⁸ *Scientific and technological base (nauchno-tekhnologicheskii zadel)* is defined as "a body of knowledge in the fields of science, technology, and critical technologies, whose development and implementation in production processes leads to increased efficiency of industries, as well as to the development of new technical systems (products)." See Ministry of Defense of the Russian Federation, "Nauchno-tekhnicheskii zadel," webpage, undated-b.

is accompanied by a detailed description, reflecting its purpose, critical characteristics, level of readiness, estimated cost, and other parameters necessary for the Programming and Budgeting phase.⁹ The List of Basic and Critical Military Technologies is a ten-year planning document that should be reviewed and updated every five years, although that is not necessarily the case. Pankov referred to the list approved by the Military-Industrial Commission on September 24, 2013,¹⁰ but Korchak et al. (2017), referred to the list that was approved on May 25, 2016.¹¹ According to the Ministry of Defense, the main changes were related to the development of nontraditional weapons, hypersonic aircraft technologies, and C2 systems.¹² This statement suggests that the list might be updated retrospectively to include technologies that are already considerably developed. Another reason might be a dramatic change in the technological situation. For example, the conflict with Ukraine that began in 2014 and the annexation of Crimea imposed additional constraints on resources and increased demand for domestic versions of technologies (i.e., the import substitution program).

At the programming level (Figure C.2), according to Pankov, these basic and critical military technologies are developed under various government programs depending on the level of readiness and the degree of uncertainty around the execution results, including SAP, the “Development of the Military-Industrial Complex” Program, and the Prospective Research Foundation (FPI) Program.¹³ Therefore, the List of Basic and Critical Military Technologies contains technologies at different stages of the research and development cycle. Among those, the SAP is the most important document. It is a ten-year document, updated every five years, which specifies plans for the acquisition, modernization, and repair of military equipment, and for the research

⁹ Yui Borisov, “Osobyi zadel,” interview, *Voenno-promyshlennyyi kur’er*, Vol. 9, No. 673, March 8, 2017.

¹⁰ Pankov, 2014, p. 442.

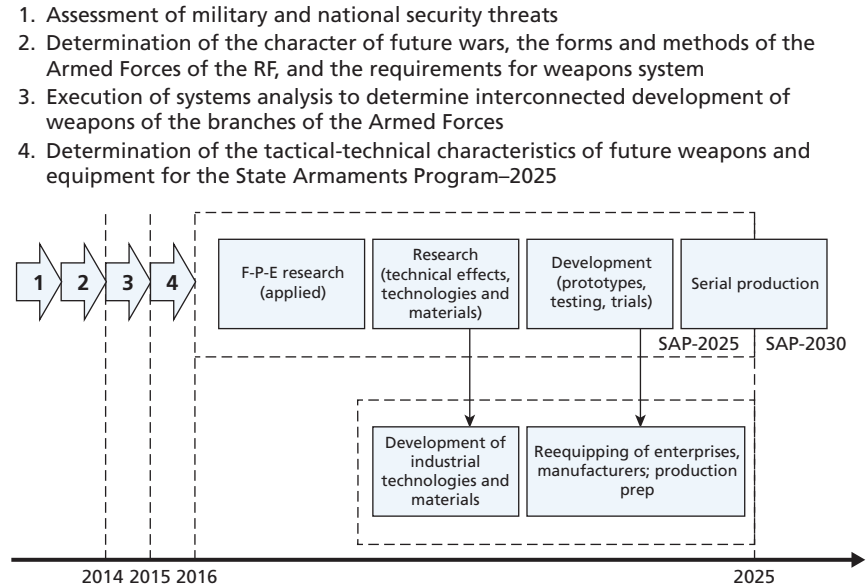
¹¹ Korchak et al., 2017, p. 16.

¹² Ministry of Defense of the Russian Federation, undated-b.

¹³ Pankov, 2014, p. 442.

and development of new weapons systems (see Figure C.3 for the R&D cycle that began prior to 2014 through 2025). The list of critical technologies is part of the integrated input data system (ESID: *Edinaya sistema iskhodnykh dannykh*) for the SAP. ESID broadly defines requirements and constraints on the future armament system; collection of

Figure C.3
Research and Development Cycle for Prospective Weapons and Military Equipment to 2025 and Beyond



SOURCE: Pankov, 2014.
NOTE: F-P-E = fundamental, prognostic, and exploratory; SAP = State Armaments Program.

those data initiates the process of developing a project of the SAP.¹⁴ In the SAP itself, basic and applied research for prospective weapons is covered in the 10th chapter of the SAP: section 10.A addresses basic research for national defense and security; 10.B, applied research for scientific and technological base for nontraditional weapons; and 10.C, applied research of nontraditional weapons themselves.¹⁵

A paper coauthored by Vladimir Korchak, who is affiliated with the Section of the Applied Science under the Presidium of the Russian Academy of Science, and three experts of the 46th TsNII MOD, notes that the choice of technologies developed under SAP is guided by the following five principles:

- Focus on the future: the development of STB for WMSE in the current planning period and the formulation of schemes and technical solutions for promising and nontraditional weapons, the development of which is planned outside the current planning period
- Standardization: the development of standard series of models (components, modules, and structural elements) of WMSE, ensuring the coherence of conceptual solutions, designs, schemes, and technological solutions
- Comprehensiveness: shortening the length of the R&D cycle through the early development and approbation of individual components, modules, and blocks and a complete solution to the most complex scientific and technological problems
- A high level of readiness and feasibility: reducing the level of uncertainty and confirming the feasibility of fundamentally new

¹⁴ ESID includes also strategic and operational level data that indicate objectives and requirements for the armament system; macroeconomic data that project volumes of budget allocations; assessment of international military technological cooperation of Russia; analysis of world trends in the development of weapons, military, and special equipment; a forecast of the development of science and technology in the interests of the defense and security of Russia; and the composition, structure, and characteristics of foreign states forces. See Vasilii Burenok, "Evolutsia i perspektivy programmno-tselevogo planirovaniia razvitiia sistemy vooruzheniia Rossiiskoi Federatsii," *Vooruzhenie i ekonomika*, Vol. 20, No. 4, 2012, p. 15.

¹⁵ Kravchenko et al., 2012, pp. 48–49.

scientific and technological solutions, reducing the time and cost of development of WMSE

- Interagency: the concentration of material and financial resources at the interagency level.¹⁶

In other words, SAP focuses on low-risk projects, while high-risk projects are developed by FPI.¹⁷ Smirnov and Reulov list ten different government programs, under which the critical technologies are developed (all included in Figure C.2).¹⁸

Each of these programs has its own annual budget, adopted either as a part of the state's budget or in the form of special legislation. For example, using the SAP, the government adopts an annual State Defense Order (SDO), which specifies the contracts that the Ministry of Defense and other security agencies will sign each year.

As mentioned at the beginning of this section, although the List of Basic and Critical Military Technologies is developed before the SAP (among other programs) and the SDO, chronologically speaking, and consequently feeds into these documents, in a legal sense it does not stand above them. It appears that the SAP is the center of gravity of defense planning because it sets expectations for the future funding of defense projects. However, because a certain portion of the budget goes to R&D of these predetermined critical technologies, defense contractors and research centers have vested interests in influencing the final version of the list. At the same time, once developed, the list influences multiple other government programs, which makes it difficult to track the level of development of a given technology. Furthermore, the number of these programs grows over time, similar to the number of strategies and policies in related areas.

¹⁶ Korchak et al., 2017, pp. 13–15.

¹⁷ Klabukov, Kramnik, and Lebedev, 2013, p. 42.

¹⁸ Sergei Smirnov and Roman Reulov, "Problemy planirovaniia programmnykh meropriiatii po sozdaniuu nauchno-tekhnicheskogo zadela," *Vestnik Akademii voennykh nauk*, No. 3, 2019.

The Methodology for Selection of Basic and Critical Military Technologies

The List of Basic and Critical Military Technologies is formed in accordance with a procedure established by the Resolution of the Government of the Russian Federation of August 30, 2007, No. 549, “On approval of the Principles of the development and implementation of State Armament Programs” (not publicly available). Smirnov and Reulov summarized the selection process with the following institutional framework:

1. 46th TsNII MOD, whose research purview includes the SAP and the military-industrial base, calls for proposals and provides input data
2. Military research institutions, the military-industrial complex, and academia propose technologies to be included on the list
3. 46th TsNII MOD conducts assessment of these proposals and presents a project based on the list
4. Main Directorate of Armaments in the MOD analyzes the project and presents it to the Scientific-Technological Council of the Military-Industrial Commission
5. The Scientific-Technological Council examines the project
6. The Military-Industrial Commission of the Russian Federation approves the list.¹⁹

In 2013, the MOD approved a set of methodologies for armament program planning developed by the 46th TsNII MOD, the Directorate of Prospective Multidisciplinary Research and Special Projects of the MOD (UPMIiSP), and the Applied Problem Section of the Russian Academy of Sciences.²⁰ The methodologies approved for the development of the list include set theory methods, expert elicitation methods, multicriteria evaluation and ranking, and elements of analysis of

¹⁹ Smirnov and Reulov, 2010, p. 30.

²⁰ UPMIiSP is led by Colonel Sergei Pankov. Recall that Yurii Chuev, referenced in Chapters One and Two, held the position of head of the Applied Problems Section of the Soviet Academy of Sciences.

variance.²¹ The crux of these methods is described in detail in Burenok (2009).²² The problem of technology selection is formulated as a ranking of a universe of technologies according to a set of predetermined criteria with the aim of selecting a subset of the most important technologies that are generally considered critical. The issue of multi-criteria evaluation of technologies is at the heart of this process and involves numerous institutions and processes, ranging from building the technology evaluation criteria to thinking about possible future scenarios and the development of perspective weapons systems that would employ such critical technologies. From a methodological perspective, multi-criteria evaluation is an exercise of collective expertise using the method of analysis of hierarchical structures (using qualitative assessment by experts) and the method of multi-criteria ranking (which combines expert opinion with quantitative data).

The Sequence of Steps

The sequence of steps in the technology selection, as described in Burenok (2009), contains five stages: the preparation of initial data, the selection of expert groups, solving the problem of multicriteria collective evaluation, the analysis of evaluation results, and concluding with the development of the final document that contains the list of technologies.

²¹ Korchak et al., 2017, pp. 17–18; see also Kokoshin, 2017, p. 349.

²² This section is a description of the methodologies outlined in Burenok (2009), pp. 178–218. It is important to note that the book does not always claim to present the actual methodologies of technology selection and evaluation. Many times, it merely states that these methodologies “might be used” or in some cases “are proposed to be used.” At the same time, Smirnov and Reulov, both affiliated with the 46th TsNII MOD at the time, reference Burenok (2009) and an unspecified document, “Methodological materials for the formation of the project of the list of critical industrial technologies until 2020 for the realization of the State Armament Program for 2011–2020,” for the details of the actual selection and evaluation methods. See Smirnov and Reulov, 2010.

Phase 1: Preparing the Initial Data

The initial preparation phase includes the development of a list of military-technical tasks for the short-, medium-, and long-term.²³ These military-technical tasks are accompanied by a large list of technologies that are candidates for inclusion in the final list of critical technologies. The initial list of candidate technologies reportedly is more than five times longer than the final list of critical technologies. The technologies are further organized into distinct scientific-technological directions to facilitate expert evaluation.

The initial preparation phase also includes the development of the relevant evaluation criteria, which are then used in the form of a survey to elicit expert opinion (see Figure C.4 for a list of selection criteria). The development of evaluation criteria is a key step in this process. In the most general terms, technologies can have the following qualities:

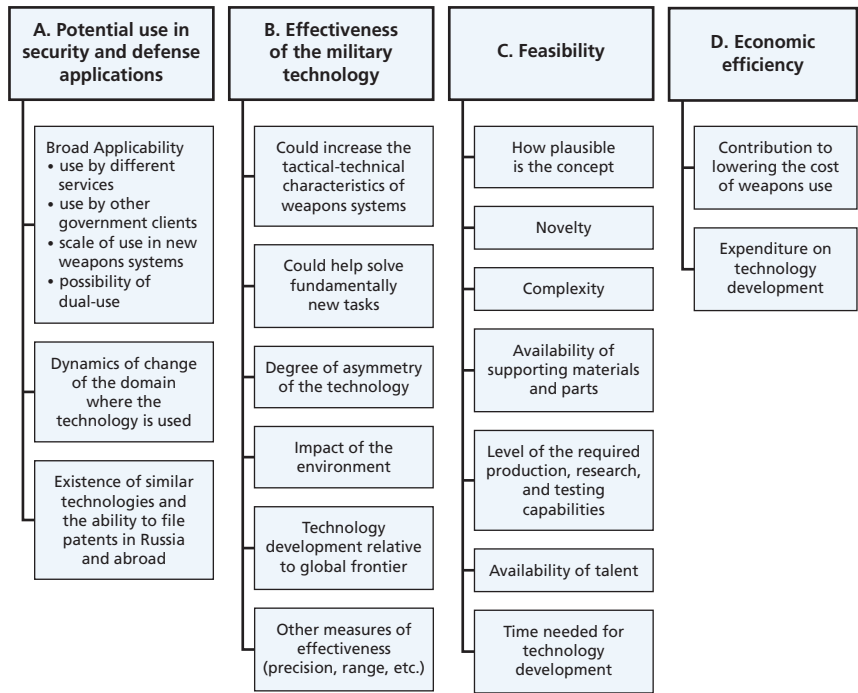
- solve fundamentally new tasks
- lead to a significant increase in the tactical-technical characteristics of weapon systems
- significantly reduce the associated costs.

Each technology is then ranked by experts on a Likert scale with five answer choices ranging from *high* to *low* for each criterion. Notably, the Likert scale is adjusted to reflect the prevalence of negative answers to the question of the level of Russian technology development relative to the global technology frontier, such that the possible answers are: strong lag (over ten years), significant lag (five to ten years), minor lag (less than five years), comparable with the world level, and ahead of the world level.

The next step of the methodology development is to build the questionnaire and to develop a set of weights that would reflect the unequal importance of different criteria. The weighting methodology presented in Burenok (2009) is derived from the AHP—a mathematically rigorous scoring method that uses pairwise comparison of differ-

²³ *Short-term* refers to less than five years, *medium-term* between five and ten years, and *long-term* over ten years.

Figure C.4
Critical Military Technologies Selection Criteria



SOURCE: Burenok, 2009. Adapted from image courtesy of East View Information Services.

ent criteria.²⁴ This is an aggregated expert judgement on the relative importance of different criteria and is determined by comparing the importance of all the evaluation criteria as pairs using a Likert scale. Within a pair, the relative importance of one criteria over another is then assessed by using a modified Likert scale, ranging from one to nine, where the score of one is given to two criteria that are “equally important” and a score of nine is given if the first criteria in a pair is “extremely more important” than the second one. The final step is to synthesize the pairwise comparisons by computing the principal

²⁴ Thomas L. Saaty, *Decision Making for Leaders: The Analytic Hierarchy Process for Decisions in a Complex World*, Pittsburgh, Pa.: RWS Publications, 1990.

eigenvector of the comparison matrix and normalizing it to obtain the weights of different criteria.²⁵

The 46th TsNII is the institution responsible for organizing the preparation work. The initial proposals of technologies come from the military commands, the research and development organizations from the MoD, the military-industrial complex, and the Russian Academy of Sciences, and academic institutions contribute to the initial selection of technologies.²⁶

Phase 2: Forming Expert Groups

The second phase of the process is the formation of expert groups for each of the scientific-technological directions identified in phase 1: expert evaluation of the initial set of candidate technologies and the creation of a database. Experts receive information on the development of domestic and foreign technologies from an information system. The 46th TsNII is responsible for organizing the evaluation of the initial list, most likely including both the formation of the expert groups and the evaluation process itself.²⁷

It is important to note that the process of selecting the List of Basic and Critical Military Technologies is connected to future budget allocations for R&D, thus creating a potential conflict of interest because the experts involved in technology selection are usually employed by the institutions that compete for government funding. The hierarchical and secretive nature of the military-science complex precludes the participation of outside experts (as is the case in civilian forecast exercise discussed later) and might potentially create opportunities for corruption. Although Russia is not unique in its desire to keep its military technologies classified, the technology selection process may not be immune to the endemic corruption in the military-industrial com-

²⁵ For an illustration, see, for example, Minh-Tuan Nguyen, *Some Prioritisation Methods for Defence Planning*, Edinburgh, Australia: Defense Systems Analysis Division, Information Sciences Laboratory, DSTO-GD-0356, February 2003, pp. 9–11. The methodology is fully described in Saaty, 1990.

²⁶ Smirnov and Reulov, 2010, p. 30.

²⁷ Smirnov and Reulov, 2010.

plex that has been identified by Russian prosecutors and the Accounts Chamber of Russia.²⁸

Phase 3: Multicriteria Evaluation

The third phase is the actual evaluation of the proposed technologies using a variety of multicriteria optimization techniques and the visualization of results. In practice, this step includes not only the analysis of survey results, but also a prioritization process in which the opinions of some scientists and their respective institutions may receive more consideration than others. This stems from the highly personalized nature of Russian bureaucratic politics, in which the opinions of certain leaders of state-owned enterprises may easily outweigh federal ministers.²⁹

Phase 4: The Analysis of Evaluation Results

The fourth phase includes the collective discussion of the evaluation results and the selection of the technologies for the final list of critical technologies. This process is effectively a compromise between all members of each expert group. If there are significant disagreements between experts, then the relevant technologies may be reevaluated and the results discussed again. The final evaluation of the list of basic and critical technologies is conducted at the level of the Scientific and Technical Council of the Military Industrial Commission because it involves coordination with stakeholders of ministerial and quasi-ministerial rank.

Phase 5: Synthesis and the Development of the Final Document

The fifth step is the development of the final document that includes the List of Basic and Critical Military Technologies. The document is then shared with the participating organizations for final agreement

²⁸ “Ushcherb ot korruptsii v voennoy sfere v 2018 godu otsenili v 7 mlrd rub.,” *RBC.ru*, May 16, 2018; and “Schetnaya palata nashla v otraslyakh oborony i kosmosa narusheniya na 1,3 trln,” *RBC.ru*, March 21, 2019.

²⁹ For example, Sergey Chemezov, the chief executive officer of Rostec, is widely recognized as one of the most powerful bureaucrats in Russia. See, for example, Minchenko Consulting, *Politburo 2.0: Renovation Instead of Dismantling*, October 12, 2017; and Tatiana Stanovaya, “Russia’s New Bureaucracy Means Tougher Times for Putin’s Friends,” Carnegie Moscow Center, October 31, 2017.

and adjustments. An explanatory note is developed to accompany the final list of technologies for each military-technical domain, and the whole package is sent via the MOD for the approval to the Military-Industrial Commission of the Russian Federation, which is currently led by Putin and the deputy chairman of the commission, Yurii Borisov.

Translation of Key Russian Terms

Fond perspectivnykh issledovaniï	Prospective Research Foundation
kriticheskie tekhnologii	critical technologies
mezhdunarodnaia obstanovka	international situation
moshch' gosudarstva	state power
napravleniia	trends
otsenka / otsenivanie	assessment / assessment
potentsial ekonomicheskii	economic potential
prognoz / prognozirovanie	forecast / forecasting
peredovye tekhnologii	advanced technologies
perspektivnye tekhnologii	prospective technologies
potentsial moral'no-politicheskii	moral-political potential
protivorechiia	countertrends
strategicheskoe planirovanie	strategic planning
uroven' voennoi bezopasnosti	level of military security

voennaia moshch' (voennaia sila)	military power
voennaia organizatsiia	military organization
voenno-ekonomicheskii potentsial	military-economic potential
voenno-politicheskaia obstanovka	military-political situation
voennyi potentsial	military potential

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The Russian Ministry of Defense uses military forecasting to inform its long-term planning. Since the 1960s, Russian military analysis has applied comprehensive assessments of a country's ability to wage war that go beyond weapons and formations. The Ministry of Defense uses this forecasting to answer (1) what is the likelihood and character of future war and (2) what is the correlation of military potential between Russia and its potential adversaries?

In this report, the authors draw on an established framework to examine key indicators related to military forecasting to gain insight into the answers to these questions. The Russian military science and academic research that the authors of this report reviewed found that the correlation of military potential (state power)—a broad measure that includes political, economic, scientific-technical, and conventional armed forces indicators—is and will be weighted in favor of the United States and the North Atlantic Treaty Organization (NATO) in the West and the United States and Japan in the Asia-Pacific region through 2040. The factors that would improve Russia's competitive position, according to the most authoritative Russian military forecast that the authors examined, are the inclusion of China in the correlation of military potential and the possible reduced ability of the United States to manage the international system in a way that favors its interests. Russia's current military assessments and forecasts have not found indications of intentions of the United States or China to launch a large-scale war against Russia. The conditions under which Russia might take preemptive military action that risks war with an opponent with superior military potential remain an open question.

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